THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XVII. No. 402—20th YEAR.] LONDON, MARCH 17, 1868. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] TREBLE No. 1s. 4d. Unstamped.

RAMSAY'S NEWCASTLE CANNEL
COAL. Analysis by Dr. FYFE, M.D.:—
9746 cubic feet of gas per ton of coal.
26-candle gas.
13¼ cwt. coke per ton of coal.
N.B.—Ramsay's Cannel most resembles the Marquis of Lothian's Cannel, but superior as to coke.
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DO. GARESFIELD COKE.

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1862.
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JOURNAL OF GAS LIGHTING NEWSPAPER

1862.

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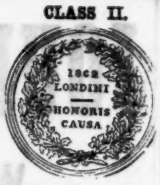

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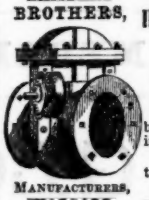

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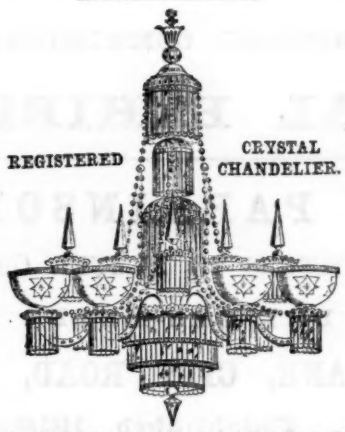
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THE

UNIVERSAL EXHIBITION OF PARIS,

1867.

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MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

A MEMBER OF THE BRITISH ASSOCIATION OF GAS MANAGERS.—*Ammoniacal liquor may be increased in strength, so as to render it a marketable article, by the process you name, but the conversion of the liquor into sulphate of ammonia is another operation, and can only be profitably carried on on a large scale.*

A SILENT LISTENER *had better elicit the information he requires at the next meeting of the company.*

NOTICES.

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THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 17, 1868.

Notes upon Passing Events.

CONTINUING our extracts from the reports of artisans sent by the Society of Arts to visit the Paris Universal Exhibitions, we commence with that of another joiner, who gives a photograph of French working men's and women's life. "It is a sight worth going to see, about 7 a.m., the mechanics wives returning from market with their baskets in their hands, containing the day's provisions. They all wear white crimped caps, and their dresses are short—no assistant scavengers." This is an advantage the French joiner has, his wife costs him little for dress. Being early risers, they do the work of their sphere in a proper time, not stopping up to a late hour, muddling by artificial light and sleeping away the light of day. Another evil a Frenchman avoids—it is a very rare occurrence for a French lady to have more than a couple of children, and these she sends into the country to be reared. The French ladies are all interested in some business, whereby they add greatly to the comforts of home. "I think the French ladies are more industrious than the gentlemen" joiners. "The French joiner usually takes coffee and bread and butter between 5 and 6 a.m. From 9 to 10 he takes breakfast: it may be soup, beefsteak, vegetables, half a bottle of wine, and bread—in all 1fr.; or *bouillon*, a *demi-bouteille de vin* (containing about a gill), *et pain*—30 *centimes*. His dinner consists of *bouillon*, veal and tomato sauce, mashed potatoes, some boiled cream (custard ?), half a pint of wine—1 fr. 20 c. Supper similar." This is a mistake: those who dine late do not sup. "Tea is little used; the wine is more wholesome, and keeps the stomach better. In most places, for 10c., they give a table napkin, but many a French joiner dines for 70c., or 7d. Some prefer bread, soup, and meat for breakfast. I observed beautiful potatoes, cooked in the street, at 1½d. the kilo. (more than a pound). Many a French workman dines on a basin of soup—whether made of frogs or not, far superior to the mess used in London as soup in workmen's dining-halls—with vegetables, bread, and about a half pint of wine. This is found to support the frame well, the air being so pure that they require little animal food."

Mr. Thomas Conolly, the Irish stonemason, so well known in connexion with the Reform League and trades-union movements, has written one of the most lively reports, full also of details interesting to his own calling. He only repeats the text of the greater number of reports when he says, "When a stone has to be worked to a mould or fitted to a square edge, no man can do it more workmanlike or to a greater perfection than an English mason, but when the hands have to realize the imagination, the Frenchman's familiarity with art, his early training in its principles, enables him to outstrip us. As every building in Paris is more or less decorated with carving, you wonder how they get all their art-workmen; but large placards are posted on public places, informing workmen where they can be taught drawing and modelling every evening free of expense. . . . There does not appear to be any regular system of apprenticeship among the masons. It is not uncommon to find men who work well at every branch." Mr. Conolly gives the following account of the *livret* system, which really places the workman entirely in the hands of the Government and police, and renders impossible what we may mildly term the independence of the artisans of England:—"When a man is first employed at any trade or occupation he has to apply to the commissary of police for a book, in which is stated his name, age, general description, place of birth, place of residence, and nature of employment. He must deposit this book with his employer, to be kept until the workman wants to leave, which he can do without *much* previous notice, and the employer must give him up the book, in which he will insert what the workman leaves for. On that day the workman must take it to the commissary of police and have it *viséd*, and when he gets another employer he must give the book to him. This employer, on telling the man to work, must send the book to the police officer, and have it *viséd*, and if the workman left indebted to his last employer the amount of indebtedness will be stated in the

book, and the new employer will be bound to stop one-sixth of each day's pay. If a man is discovered to work without having a book the employer and the workman are liable to a fine of 400fr. each." The next observation is capital—"On the whole the Frenchmen take their work easy. I noticed at least six men employed in loading a cart with rubble, and, after placing themselves in a row, they handed the stones from one to another. In London they would never think of sending more than a couple of men to such a job, and they would have to pitch them from where they stood to the cart. The materials for all their buildings are lifted to the floor levels by machines, some very ingenious; those in large buildings worked by steam power. It struck me, while looking at these machines, that if there were not so many Irishmen, England would use her labour more economically." A workman earning 7fr. a day usually spends 3fr. for his food at the cook-shop. Lodgings for a single man are 3fr. a week; for two rooms from 8 to 10fr. Rent has increased so much that a large room which let in 1860 for £10 a year now lets for £16. We must defer noticing the report on the watch trade, which is most important, because it contains an account of a technical school.

For amusement we recommend the report of Mr. R. Sinclair on tailors work—evidently one of the most ardent sympathizers in the late London tailors strike. To him the British master tailor and foreman is a black beast, with no redeeming quality. Like the anti-revolutionary poet in the "Rejected Addresses" exclaims—

> What caused the price of bread and beer to rise?
> What filled the butchers shops with large blue flies?
> The French who——

all the tailors ills are due to the capitalist tailor. Still, Mr. Sinclair is an amusing fellow, and a profound critic in his art. Mr. Smallpage's work is, of course, treated with contempt. But his enthusiasm rises to the highest pitch when describing an Austrian coat—"a splendid made coat, and would have taken, I think, any man a month to make." In first-class cloth he thinks all much below England, except some French mixed or spangled, "which looks rich in comparison with the cheap Yorkshire cloths." French tailors are outnumbered by foreigners, including Germans (the most numerous), Alsatians (whom the French class as foreigners), Italian, a few Spanish, Belgians, Dutch, Swiss, with a goodly sprinkling of Russians, Swedes, Danes, and Norwegians. There are not more than twenty or thirty English, at the outside, in Paris. The grievance of the Paris tailor is that he has to come from his home at Montmartre to have a coat tried on, and then altered; thus he loses a day and a half, for which he receives no pay. "A coat will often be six times ready to try on, and no pay for it, and the tailor will often lose two days a week." It seems that the tailors of Paris, as a rule, live at home, and do not work in shops. It seems that the Paris tailors struck against the trying-on system, but the Government interfered; the men were told their meetings must cease, the committee were summoned before the Commissary of Police and fined heavily, and so the strike was put down. Nevertheless, Mr. Sinclair thinks that the Paris tailor is better off than his London brother—has better wages, and more constant work. His ideas of "respect" are comic. "The French master treats you with more respect. Like the English master he roars and finds fault with your work, but you are allowed to roar back, and he does not complain. But answer back a West-end foreman or master, and you are immediately discharged. A pretty state of things in the nineteenth century between employer and employed!" Mr. Sinclair finds the Parisian tailors more temperate than those of London, "because they earn the necessaries of life easier than in England." The dining in Paris is better than in London. "They go to their food from eleven to twelve o'clock in the morning, eat comfortably (quite the reverse in a London shop), partake of plenty of food, with their pint of wine and a good taste of fruit, finishing with a cup of coffee and a cigar; he has two meals a day." These tailors with cigars are evidently first-class hands. "The West-end London tailor's dinner generally consists of half a pound of steak, often hard and badly cooked, a halfpenny worth of bread, two potatoes for a penny, a pennyworth of greens, a thimbleful of gin, and a dirty pint of porter." This inferior dinner is no doubt due to the machinations of the West-end masters and their foremen; who also, we have no doubt, insist on their men drinking porter and gin drugged with strychnine, instead of *vin ordinaire*. The amusements of the Paris tailor are manifold, and, if he "has no money, he can hire himself to the *claque* master, and be placed in the best seats in the house to clap his hands and shout for the success of the piece." We are afraid that, if Mr. Poole were to make an arrangement of the kind at any London theatre, the hired applauders might get hardly used—such are our insular prejudices. We must refer to the original report for a list of the delinquencies of the London foremen tailors, who, by-the-by, have not the assistance of the *livret* or the authority of the police to back them, as in Paris. In one respect, Mr. Sinclair has changed his mind. He approves of the sewing-machine, against which the trade have struck more than once. "It is a fact that all connected with the tailoring trade become bad tempered," says Mr. Sinclair, in reference to the arrangement by which, in Paris, the foreman—who is not, he says, a foreman, only a trimmer—bears the master's abuse when clothes do not fit.

It would seem from the evidence of these artisans reports, that the mechanic in France, and especially in Paris, is the particular object of the care of the Government. His birth is registered, and from that moment he never ceases to be under the paternal eye of the Government. An excellent plain education is provided for him, which is strictly the same in every school in France. If he has the least taste for art or geometry, he can receive instruction from good masters gratuitously after he has left school. Libraries of expensive books and museums of art and science and technical trades are open for his especial benefit. In order to give him constant employment, improvements, consisting chiefly of the destruction of old buildings and the construction of new streets, palaces, churches, theatres, barracks, Government offices, boulevards, fountains, parks, and gardens, have been undertaken and carried out for more than eighteen years, at an annual cost to Paris of some seven or eight millions sterling, which have made Paris the most splendid and one of the most attractive capitals in the world, largely frequented by strangers, who create a new demand for the labour of the art-workmen of France. As the French mechanic likes varied, or what we call French cookery—as fuel is more than twice as dear as in London, and water very dear—as also the French mechanic likes society and amusement, the law of supply and demand has provided him and his wife or sweetheart with places where he may, and where as a rule he does, pass his time—splendid *cafés* and *restaurants* for the million. As the Frenchman is naturally sober, although much corrupted lately by the taste for poisonous absinthe imported by old African soldiers, he finds in his favourite *café* an ample supply of light and refreshing drinks besides wine, which our men would abuse as vinegar. As he is sober, so he is economical, and has spare pence to lay out in amusements, cheap theatres, and dancing-rooms. As he does not, like English and Americans, desire to dress like his employer, his clothes do not cost him too much; and as his wife does not wish to dress like a lady, or like a lady of the pavement, she, too, spends less than an English mechanic's wife on her costume. The habit of living in public, and the drill of four or five years in the army, through which most able-bodied mechanics have passed, give him better manners than those who live only in their own class. To amuse the mechanic class, the Government provides reviews, *fêtes*, theatres, and exhibitions. The French mechanic has a just idea of his personal dignity, and therefore as he has not the power to tyrannize over his employer, his employer must treat him with respect. On the other hand, the Government exacts something in return for the prizes, the bread, the wages, and the amusements which she provides for her favourites—the working men. He must have papers showing his name, age, residence, and employment, which any policeman may ask to see, which identify him at once if he needs and asks for relief, so that there is not the confusion between honest distress and professional imposture that exists in this country. To beg without a licence, even to walk about ragged as if you wanted to beg, to be found without any visible means of getting a livelihood, are all offences which justify arrest, temporary imprisonment, and finally punishment in a very summary manner. In a word, the policeman is the workman's master, and a disrespectful gesture to an "agent of authority" is more severely punished than a blow in this country. Then the *livret* system gives such enormous power to employers that it is easy for them to be on good terms with their workmen. Theoretically, workmen may strike for higher wages, but as they may not write in newspapers, or meet more than nine-

teen, or make speeches, or stand about a factory in crowds, silent strikes against machinery, against apprentices, or against the employment of any one are impossible. Our working men saw much to admire in Paris. They can have most of it at the same price, but they cannot unite the benefits of liberty and the benefits of police government. If the taxes levied on eatables, drinkables, and fuel were possible in London, we could spend 10 millions a year on public buildings and public improvements. It is now certain that much more than has been done must be done for the education of the masses. More and better schools, libraries, and museums; more instruction in the arts likely to be useful to mechanics; but economy, sobriety, and manners they must teach themselves.

The grocer in France is always quoted as the type of the most selfish and the most narrow-minded class of the political community. The *épicier* is supposed to be the Ultramontanist of tradesmen—that is, he desires to have perfect liberty to make money at the expense of every one else. That is his notion of free trade. We are far from attributing the same degree of inferiority to our retailers. They have the advantage of newspapers of a character and power very different from the dirty little rags which are the only reading of the French tradesmen. They have the education of public business, and public meetings, and live altogether in a larger circle of public opinion than their French fellow-shopkeepers. It would be gross injustice not to admit that the West-end tradesmen of London include many highly educated, highly cultivated, enlightened, and patriotic individuals. At the present moment it would be easy to name retail tradesmen distinguished in art, in science, and even in the higher branches of political economy. But taking "the lot," as a Yankee would say—

> You may break, you may ruin the vase if you will,
> But the scent of the roses will hang round it still;

as is amply proved by the authentic report of the speeches delivered at the "numerously attended and highly influential meeting of the members of the retail grocery trade," as reported in their organ, the *Grocer*, of the 7th inst. Ignorance is common to all classes of society, but to find people carefully correcting "proof-sheets" of their own ignorance of the principles of liberty we all enjoy, is truly astonishing in these days of public discussions and penny papers. The circular calling the meeting begins with suggesting the propriety—which nobody can deny—of forming an association to watch the fiscal changes affecting colonial produce which are so frequently made; but the idea that gave life and fire to the meeting is contained in the following paragraph:—"The competition resulting from the establishment of the so-called co-operative stores deserves special attention on the part of the trade—not that it is for one moment believed that the flag of individual enterprise will droop before this new opposition; but a just cause of complaint does certainly exist, inasmuch as the civil servants of the Crown, under a Government name, are using their influence with the professed object of substituting mere distribution without profit, for fair trading." The grocers were proved some years since, by the analytical papers of the *Lancet*, to be the chief organs for distributing adulterated goods. They recently attracted the special hostility of licensed victuallers, much to the advantage of the public, by dealing in cheap wines and bottled beer, and they are now banding like sheep, in indignation and alarm, because gentlemen "connected with fashionable society" have given themselves a great deal of trouble without any expectation of profit, to "supply grocers goods of a genuine character at reasonable prices for cash." With the fatuity peculiar to the *épicier*, the meeting put a very honest man in the chair, who, although he sympathized entirely with their prejudices, cut the whole ground from under his applauding supporters by his facts. Mr. Newsom, formerly of the Borough, where West-end credit and West-end prices are equally unknown, told the meeting that during the last six years of his trading his trade expenses, including interest on capital, did not average more than 8 per cent., and his bad debts were less than half per cent. If we could get Mr. Newsom under the examination of a committee of customers, we should find that the prices by which, with these expenses, he managed to make a fortune were so moderate that, had they been followed by his fellow West-end tradesmen, no co-operative society would ever have been needed or started. He went on to say, very truly: "If I, with my machinery, could work my business at 8 per cent., while it costs co-operative societies 10, 12, and 14 per cent., I should rejoice in the competition, and should expect in the course of a short time to see my enemy retiring from the field." But Mr. Newsom's candour did not stop here; he pointed out the fatal effects of "the dreadful—that almost universal—system of selling sugar under cost price:" that is, selling one thing too cheap in order to sell half a dozen articles too dear—an undesirable example of "illegitimate trading." Mr. Puckridge, who followed, was a truly delicious specimen of the grocer pure and simple—the unadulterated grocer. He thinks that the public cannot possibly understand the propriety of grocers West-end prices, "without being apprenticed for seven years to a grocer," and we quite agree with him; nothing less than that term would produce the requisite degree of corruption. He did not venture into figures—to give prices for credit and prices for cash—but contented himself with stating, what nobody can deny, that certain classes require credit; and what every one of any experience will deny, that there "is a difference between the credit and the ready-money customer, and that if a man wanted twelve months credit he was charged a fair per centage in advance, which was only fair"—the truth being that publicans are doing a large trade by selling tea at 2s. 6d., which Mr. Puckridge's friends sold over the counter for 4s. a pound before this competition commenced. But the grand feature of the meeting was a series of attacks on the Civil servants, who, as a body, poor and genteel, have been driven to follow the example of the working men of Rochdale, and establish a society to protect those willing to pay cash from credit-West-end prices. The grocer-mind is not able to understand that the Government, having a large business to do, employs a large number of servants to do it. It is presumed that these servants do all they engage to do for their salaries. If they are paid too much and work too little, that is a legitimate question for agitation, inquiry, and reform—just like an inquiry into the management of Plymouth Dockyard or Marylebone Workhouse. But the indignant Mr. Puckridge, maintains that the gentlemen of the Admiralty, Somerset House, and the Post-Office, are paid salaries unnecessarily high, in order that they may be the customers of West-end shops; and he says virtually, "As long as you will let us charge you what we like, you may take the money of the nation, and do as little as you like; but if you prefer economy and cash payments, then we will raise a cry against you." The dishonesty of selling sugar under cost price is not so great as the claptrap about the expenses of the Civil Service having risen to eight millions a year. If that sum is too much, if we have more civil servants, or pay them higher salaries than their duties justify, let us have inquiry and reform; but certainly England, Scotland, and Ireland are not prepared to be taxed that tradesmen between Charing Cross and Hyde Park Corner may keep hunters in Berkshire and Hertfordshire, other luxuries in cottages in St. John's Wood, and deck their aspiring spouses with hired diamonds. "Live and let live," quoted with applause at the meeting, is a very good motto, but it really means, "You live as you please, and I live as I please." Mr. Grocer agrees with the butler, that when the master pays his own bills, insists on discount for cash, and objects to poundage to the upper servants, he is a very low fellow. The real gentleman is reckless in orders, and slow but sure in payment. A Mr. Challett imitated the chairman's candour, and said that "a great deal of the success of the co-operative movement was attributable to the fact that, in consequence of loss upon sugar, other articles were sold at too high a price. No doubt it seemed an exorbitant profit to get 50 per cent. on an article requiring no exercise of judgment on the part of the tradesmen, but they could only compete with the Civil Service by charging a fair profit upon sugar." Thus he admitted the truth of the statements, for making which the intelligent meeting "groaned" the *Pall Mall Gazette* and *Saturday Review*. Mr. Bennett recommended them to "revise their tariff, and make every article live by itself," another testimony to the necessity for the co-operative movement. The official report of this meeting proves clearly enough that the co-operative movement has done a great deal of good. The grocers will, it seems, revise their prices, treat ready-money customers more fairly, and discourage adulteration. The public asks no more. If incidentally the agitation leads to a reform in the Civil Service, now that the obsequious tradesmen of the West-end find they are not to have a share in any job, so much the better. It will occur to

many of our readers that these tradesmen, so furious against what they call the competition of illegitimate traders, include many who have been foremost in an endeavour to rob the shareholders in gas companies of dividends either paid for in premiums or earned by great risk and long waiting for returns. It is the grocer class who have endeavoured to reduce dividends to a point at which it is really not possible to raise money for any new undertaking. And this is their notion of "Live and let live." "Sir," said a candid Ultramontane priest, "I claim liberty to do as I please in England, because those are your English principles; and I object to you Protestants preaching, praying, teaching, marrying, or burying in Rome, because those are our principles." We commend this story to the grocer who objects to illegitimate trading and cash payments.

Circular to Gas Companies.

The preamble of the Bill introduced into the House of Commons by Mr. Morrison, to amend the Metropolis Gas Act of 1860, is the briefest possible. There is no allegation that the provisions of the Act have proved unsatisfactory, nor that they have in any way been contravened; but it is simply asserted that "it is expedient that better provision be made "respecting the supply of gas to the metropolis." The Bill has evidently been hastily drawn, and the inventors of it seem to have had two or three distinct and scarcely compatible objects in view. Its most prominent portion is intended to confer powers on the Commissioners of Sewers and on the Metropolitan Board of Works to purchase compulsorily the undertakings of any of the metropolitan gas companies, on giving notice to that effect within six months after the passing of the Act; the consideration and the terms of purchase, on default of agreement, to be fixed by an arbitrator appointed by the Board of Trade. Power is also to be given to the Commissioners of Sewers and to the Metropolitan Board of Works to take gas in bulk from any of the companies within the limits of their respective authorities, on such conditions as may be agreed on or fixed by arbitration; in which case they may lay down mains and execute all works requisite for the supply of gas for public or private lighting. If the former portion of the Bill be carried and brought into operation, then the remaining parts, which relate to the amalgamation of the companies and to the regulation of the supply of gas by independent companies, would be almost inapplicable and without effect. The term "hybrid Bill"—which is the parliamentary designation of a Bill of this character, partly public and partly private—is remarkably appropriate to Mr. Morrison's Bill, for it is mongrel in its character as well as in its technical form. Assuming, however, that neither the Corporation nor the Metropolitan Board of Works are willing to purchase the undertakings of the gas companies—on which assumption it may be presumed the promoters of the Bill have relied—then its provisions as regards the gas companies and the supply of gas differ in only a few essential particulars from the Bill of last session after it had been amended in committee, with the addition of those provisions relating to the proposed amalgamation of some of the companies. In that portion of the Bill it is provided that schemes of amalgamation shall be either submitted by the companies themselves to the approval of the Board of Trade or, in default of such agreement, that a scheme shall be framed by commissioners to be appointed by the Board. The machinery for regulating the quality, the purity, and the price of gas, by means of gas referees, examiners, and an examiner-in-chief, and by commissioners, and the examination of the accounts by an independent auditor, is similar to that of the amended Bill of last session. The divided profits of the companies are not to exceed 10 per cent. per annum, "unless a "larger dividend in any one year be necessary to make "up the deficiency of any dividend that may have fallen "short of that rate in the then last preceding year." The gas is to be absolutely free from sulphuretted hydrogen, the quantity of sulphur in any other form being left for determination by the gas referees; and in the regulation of the illuminating power it is provided that from the 30th of September, 1868, until the 1st of January, 1870, it shall not be less than 14 candles, to be raised after that period to 16 candles. The maximum price, until the 1st of January, 1870, is to be the same as now charged by the several companies, and afterwards the general maximum is not to exceed 3s. 9d. per 1000 feet. It is provided, however, that the Board of Trade may, before the year 1870, on the recommendation of the gas referees, and with the consent of the gas companies and of the local authorities, substitute 14 or 15 candles for 16 candles as the minimum illuminating power to be supplied in that year, with a proportionate reduction in price of 2½d. per candle. Provision is also to be made for a revision of the scale of illuminating power and price after the year 1870, the commissioners to be appointed for that purpose being required to fix such an illuminating power and such a price as shall be calculated to yield to the company, with due care and management, a dividend "attaining as near as possible, but in no case exceeding, the "rate of £10 per centum per annum, and to make up any "deficiency in the then last preceding year authorized by this "Act to be made up;" with the proviso, however, that they shall not in any case fix an illuminating power lower nor a price higher than prescribed by the Act of 1860. All gas supplied by a company to a private customer is to have a pressure of not less than six-tenths in the daytime, nor less than one inch from sunset to sunrise. The only provisions respecting the lighting of public lamps are, that a governor shall be affixed to each lamp, and that the price charged shall not be higher than is charged to any private consumer, unless special circumstances justify a higher charge, which question is to be determined by arbitration. The foregoing abstract sets forth the main provisions of Mr. Morrison's Bill for amending the gas supply of the metropolis, the incongruities of the different portions of which render it apparently so unreal that until it has received the sanction of a second reading, and been referred to a select committee, we shall not attempt to point out what would be its effect on the metropolis gas companies in the event of any of its three separate portions, or of the whole together, passing through Parliament.

We are glad to perceive that Mr. Ayrton has withdrawn the notice of motion he gave for referring all the metropolitan gas Bills of the present session to the same committee as last year, and that he has substituted for it a notice that the committee be named in the ordinary way. He was most probably induced to do so by a series of "reasons" which were printed and extensively circulated, forcibly pointing out the injustice of referring those Bills to a committee having such decided opinions against the metropolitan gas companies as were expressed in their report of last session.

Mr. Dodson, the chairman of committees of the House of Commons, is taking vigorous adverse action against gas companies in all parts of the kingdom, by endeavouring to facilitate the introduction of new competing companies. In the first place, he is to move this evening (the 17th inst.) for the abrogation of the Standing Order which permits existing companies to be heard against new schemes on the ground of competition; and in the next place he has declared his approval of the principle of a Bill about to be introduced into Parliament for vesting in the Board of Trade the power of authorizing the establishment of any new gas or water company, on proof of the consent of the local authorities of the district. The serious consequences to be apprehended from the removal of the barrier to the introduction of new competing schemes which the existing Standing Order presents is noticed in another column; and, if such a measure as the second one were passed, it would throw wide open the flood-gates of competition, and threaten destruction to all gas companies. It would be to convert the Board of Trade from an administrative department of the Government into a legislative body, with arbitrary power to destroy existing interests at pleasure, according to the caprice of the Minister of the day. The sword of Damocles would be suspended over the heads of all the companies, ready to fall at the nod of the President of the Board of Trade, and they would be in constant dread lest the influence or jobbery of Local Boards should induce him to give the signal. We cannot conceive that anything so monstrous will be attempted, but it has received the sanction, by anticipation, of an influential member of the House of Commons, and all gas and water companies should be on the alert to give such a despotic confiscating measure their determined and united opposition.

The model Corporation gas supply of Manchester is presenting a new phase to its admirers, which exhibits great ingenuity in the endeavour to conceal the recent deficiency in the revenue of the undertaking. The Gas Committee had the problem before them, how to secure an amount of profit equal to 10 per cent. on the amount of capital employed in the manufacture of gas, at a time when the increased cost of manu-

facture has reduced the profit to little more than 5 per cent. The usual course adopted would be to raise the price of gas, as was done under similar circumstances by the Liverpool United Gas Company; but such a common matter-of-fact way of getting out of the difficulty would not suit the clever managers of the Manchester Corporation Gas-Works, and it would have somewhat tarnished the lustre of their renowned success. They accordingly concocted the device of making up the deficiency by what they term a "suspension account," to which the overpaid balances are to be carried, in the hope that the amount may be recouped by extra profits to be gained in years to come. This proposition is, in plain words, an attempt to pay for town improvements out of gas profits *in prospect*. It is no doubt a novel and ingenious plan for hiding a falling off in revenue, but though it may excite admiration when practised by a corporate body, it would scarcely be tolerated in the management of a gas company. It amounts, in point of fact, to the borrowing of money for the payment of dividends to keep up a false appearance, and any gas directors who were guilty of such deception would be severely and deservedly denounced.

An important action against a gas company for nuisance was tried at the Bucks Assizes last week, the report of which we are compelled to defer until our next issue. The defendants were the Slough Gas Company, and the plaintiff the owner and lessor of the land on which the company's works are erected, and he is also the owner of considerable house property in the neighbourhood, one of which houses he occupies. The company applied to Parliament, two years ago, for additional powers, when they were opposed by the Local Board, on the ground that the works were a nuisance; but the attempt to remove them failed, the committee having assented to the argument urged by the counsel for the company, that the law was sufficiently powerful to protect those who were damaged by the company's operations; and to the law, accordingly, the plaintiff in this action appealed. There were two counts in the declaration, the first of which was founded on a covenant of the lease, whereby the defendants bound themselves to use all practicable means for preventing the escape of noxious effluvia from the works; and the second was founded on the common-law right of every one who has ground of complaint against his neighbour for a nuisance. Much contradictory evidence was given on both sides; but the jury, after the case had occupied two days, gave a verdict for the plaintiff on both counts, with £300 damages. A second action of ejectment for breach of covenant of the lease stands over, and 22 other actions, maintainable under the Gas-Works Clauses Act, 1847, are threatened by the owners or occupiers of lands whereon the wells have been polluted by refuse from the gas-works, each of whom can claim, according to the provisions of that Act, £200 damages, and £20 for each day during which the pollution continues! In addition to these heavy responsibilities, the plaintiff in the action just tried can come on the defendants, year after year, with further claims for damages should the nuisance continue; or, having established his right at law, he may apply for an injunction in Chancery to compel the company to stop their works, and thus complete their ruin. An offer was, we believe, made by the plaintiff's counsel, during the trial, to consent to a verdict with nominal damages, leaving it to Dr. Letheby and Mr. Barlow to determine what should be done to diminish the nuisance; but that liberal offer was declined by the defendants, who preferred to have the verdict of the jury, with all its consequences. The removal of the works must be the ultimate result, and the sooner the company resolve to do so the sooner will they extricate themselves from the difficulties into which their obstinacy has plunged them.

The Dover Gas Company and their managers, Messrs. Anderson and Jones, guided by more prudent advisers than the Slough Gas Company, consented, at the recent Kent Assizes, to refer a somewhat similar action brought against them by the Dover Local Board to Dr. Odling, under the circumstances stated in a report of the proceedings inserted in another column.

The adjourned meeting of the City of Moscow Gas Company has been postponed from the 6th to the 20th inst., to allow more time for the investigation of the accounts by the committee of consultation appointed at the last meeting. It appears to us that the most satisfactory statement that could be produced at the approaching meeting would be a profit and loss account for the year 1867, from which some definite opinion might be formed of the prospects of the undertaking, the absence of which account has given rise to unfavourable comments.

The creditors of the County and General Gas Consumers Company have been required to send the particulars of their claims to Mr. J. W. White, the accountant, of King Street, Cheapside, one of the official liquidators, by the 4th of April, the 16th of that month having been appointed for the adjudication.

The Cambridge Gas Company have filed a Bill in Chancery praying for an injunction to restrain the new gas company from opening the steets for the purpose of laying their mains in that town. We shall watch the progress of the proceedings in the case with much interest, and trust the application will prove successful.

The balance-sheet of the Brighton and Hove General Gas Company for the year 1867, which will be found in another column, shows the profits to have been £5781 19s. 5d. on a gas-rental, at 3s. 6d. per 1000 cubic feet, of nearly £30,000—a sum sufficient to pay an average dividend of 5½ per cent. on the share capital of £105,050, besides £350 for interest on loans, and £628 charged for depreciation of works.

We are compelled to defer our remarks upon the Weymouth gas valuation case, and more particularly upon the important evidence given by Mr. Innes, till a future number; and, as that evidence may exercise a very prejudicial influence on the value of metropolitan gas property, in the event of any of the proposed schemes for the purchase of the undertakings by the local authorities being adopted, we give it in question and answer, in order to prevent any misunderstanding as to its purport.

Communicated Article.

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EXPERIMENTS ON THE FLOW OF GAS IN LONG PIPES,

MADE IN THE WORKS OF THE PARIS GAS COMPANY.

By M. Arson, Engineer of the Company,
Assisted by
MM. Monard and Honoré.*

TRANSLATED EXPRESSLY FOR THIS JOURNAL
By Dr. Pole, F.R.S., Mem. Inst. C.E.

The knowledge of the physical laws relating to the flow of gas in long pipes presents an interest which increases with the number and importance of the cases to which they apply.

The distribution of gas for illumination, for example, has become a large question, by reason of the nature of the service to be ensured and the magnitude of the means necessary to be employed.

The certainty of attaining the end proposed, in the large modern schemes for gas lighting, is demanded by the great cost to be incurred; but the authors are of opinion that the state of knowledge on the point is not sufficiently advanced to secure the required results being attained in the most economical way, as the flow of gas in long pipes has not yet been subject to such accurate study as that of water.

Girard, in 1821, published the results of experiments made by him, but the small size of the tubes he used (gun-barrels) rendered his results inapplicable to cast-iron tubes of large dimensions.

D'Aubuisson, in 1827, made a step in advance by experimenting on larger tubes, but he only estimated the flow of gas by calculation; and the determination, already so delicate, of the loss of pressure by friction, was probably affected by all the uncertainty existing in the determination of the quantities discharged, and consequently of the velocities produced.

Besides, D'Aubuisson assumed that the nature of the interior surface of the pipe had no influence on the flow of the gas, and it was doubtful whether his observations, made on tubes of tin plate of 5 centimètres (rather less than 2 inches) in diameter, were comparable with those to be made on large pipes of rough cast iron.

Péclet, in his valuable work on the application of heat, published in 1843, has made reference to the data applicable to the question. He cites with care the experiments of D'Aubuisson, but he expresses his want of confidence in the results, as he is of opinion that the coefficient of friction ought to *vary according to the nature of the surface.*

In the absence of exact rules, engineers engaged in the great problem of gas distribution have sought, in practical facts, the information necessary to confirm or modify the figures given by D'Aubuisson.

M. Mayniel, then engineer to the *Compagnie Française*, at Paris, had observed the loss of pressure sustained by the gas

* The experiments were made by order of M. de Gayffier, Ingénieur-en-chef des Ponts et Chaussées, director of the company, and of M. Camus, sub-director. They were reported in a paper presented to the Société des Ingénieurs Civils, which was rewarded with the gold medal, and published in the memoirs of the society.

transmitted from the works in the Faubourg Poissonnière to the Administration des Postes by a cast-iron pipe of 216 millimètres (about 8½ inches) in diameter, and which supplied no other service on its way.

These data led him to adopt a coefficient applicable to the purpose he had in view, as it was drawn from a real practical case, and embraced necessarily the influence of all the acting conditions, such as the surface friction, the bends, the want of correspondence at the joints, the nature of the fluid transmitted, and so on.

The rule thus obtained is, however, of only limited use, and is inapplicable to other diameters, as has been found by other observations on large pipes transmitting gas to Paris. The loss of pressure was much less than it should have been, according to the above rule; but it should be remarked that these pipes were made of sheet iron varnished, and it was necessary to inquire whether this different condition of the internal surface might not be the cause of the difference in the loss observed.

About this time appeared M. Servier's French translation of "Clegg's Treatise on Gas Lighting,"* which gave a collection of numerous and circumstantial experiments on the subject, but still left the difficulties unsolved. These data gave a new interest to the question, and led to the more special and complete investigation which forms the substance of the present publication.

Means and Methods of Observation.

In order to produce, in long tubes of large diameter, a flow perfectly uniform, and to be able to define accurately the constant pressures during a given time, it was necessary to draw the gas from a source constant in its action and of relatively indefinite capacity.

The use of a gasholder acting as the first cause of the motion was, therefore, necessary. This would also serve as a direct means of measuring the quantity discharged, always assuming that the quantities were proportional to its capacity and its direct descent.

A gasholder of 15,000 cubic mètres (about 530,000 cubic feet) capacity, newly erected at the works of St. Mandé, was employed in the first instance for these purposes.

A Beale's exhauster, worked by a locomotive engine, refilled the gasholder with air after its contents had been discharged.

The experiments as regards pipes of very large size were made upon air whose density was carefully determined by observation of the temperatures and pressures, with instruments of great precision.

In order to avoid the errors of observation which might arise from irregularities in the descent of the gasholder, two observers, placed at the extremities of the same diameter, and working by a common signal, determined, by the mean of their readings, the true descent, from which the quantity was calculated.

The pipes were placed level on the ground, in a straight line, as long as could be obtained, which was 100 mètres in the clear (328 feet).

Their junction with the outlet-pipe of the gasholder was made by a length of pipe not included in the experiment, and the initial pressure was observed in the straight part of the pipe, where the bends and changes in the direction had no longer any appreciable influence.

The pressures and temperatures of the air in motion were observed at three points of the length experimented upon—namely, at the beginning, the middle, and the end.

Under these conditions, the experiments were conducted on pipes of 50 centimètres (nearly 20 inches) and 325 millimètres (nearly 13 inches) in diameter.

Those tried on smaller diameters did not succeed; they were evidently subject to errors, probably due to the method of observing the quantity discharged. The gasholder used to cause the motion was of dimensions disproportionate to the feeble discharges of small pipes, and the irregularities of its indications had a disturbing effect on them, which rendered the trials valueless.

Moreover, the time arrived when the gasholder was wanted for service, and the experiments were transferred to another station, at Villette, where another new gasholder was free.

In this gasholder it was proposed to carry on the experiments, no longer with atmospheric air, but with the gas actually supplied for illumination.

But it was necessary to adopt a system of measurement more in proportion to the quantities discharged, and for this purpose recourse was had to the gas-meter.

The station-meters were capable of measuring large quantities, such, for example, as 1000 cubic mètres per hour; but, in order to render the measurements more exact, different sized meters were used suitably proportioned to the quantities to be discharged.

The air or gas furnished by the gasholder passed first along the pipe experimented on, and then escaped by the meter, which indicated its volume.

An accurate barometer, sensitive thermometers, and a seconds watch were also employed for the various observations.

The joints of the pipes, which were made with lead, were carefully observed during the progress of the experiments, and their tightness was proved by the aid of soap solution poured upon them.

The pressures were determined by instruments of the same nature as the gas registers employed in gas-works, and which were capable of indicating differences of pressure of 1-100th of a millimètre (1-2500th of an inch) of water. [A detailed description of these instruments is given in the original paper.]

At Villette, as at St. Mandé, the pipes experimented on were placed in a straight line, on ground perfectly level, and giving 300 mètres (984 feet) length, without bends or deviations.

The junction with the gasholder was also made, as before, by pipes not included in the experiment, and whose position was independent of it.

The observations on the flow in large pipes were again made with atmospheric air, but those tried on pipes of 81 and 50 millimètres (3·2 and 2 inches) were repeated with the gas supplied to the city. By this means the law of the proportionality of the density, which enters into the expression of the loss by friction, has been confirmed.

Before carrying out the experiments,* it was thought advisable to submit the arrangements to the Society of Civil Engineers, and an objection was made to them as follows:—

It was said that when a manometric tube was introduced into the side of a pipe, the indication of the pressure would change according to the depth to which the mouth of the tube penetrated, and that, consequently, the pressure indicated might not be the true one.

Believing, however, in the accuracy of the principle that the various layers, flowing with motions rectilinear, parallel, and uniform, must necessarily be under equal pressures, it was suggested that the variation dependent on the penetration of the pipe was due to the disturbance of the fluid caused by the projection of the pipe itself, the layers being caused to describe a curve over the orifice, and the pressure thereby being interfered with.

Trials were made on this hypothesis by applying to the end of this tube a thin flat disc of metal, to isolate the layers passing before the orifice from those surrounding the tube. It was found that, with this precaution, the pressure was equal in all parts of the section, whatever the penetration of the tube; and hence it was established that a manometer, applied to the surface of a pipe in such manner as not to offer any projection capable of troubling the motion, would indicate the true pressure of the entire transverse section of the fluid in the tube.

In order to reduce as much as possible the influence of variations of temperature, no experiments were made on those days of summer when the sun exercised too powerful an influence on the pipes placed out of the ground, and some results affected by this condition have been expunged.

In all the experiments considered and recorded as successful, the temperature of the gas discharged has been constant during the experiment. It may therefore be said, as to the influence of this cause on the change of volume of the gas, that it has been subject during the flow to Mariotte's law, as nothing could interfere with the propriety of its application.

Theoretical Formulæ.

As the first trials made at St. Mandé on pipes of large diameter did not offer a great variety of conditions, they may be expressed with sufficient accuracy by the formula employed by D'Aubuisson.

$$Q = K\sqrt{\frac{HD^5}{L\delta}}.$$

[Where Q = Quantity discharged.
H = Initial pressure.
D = Diameter of pipe.
L = Length of pipe.
δ = Density of gas.
K = A constant coefficient.]

It was only necessary to determine, by the experiment, the value of the coefficient K.

The experiments made at La Villette on small pipes demonstrated that it was not possible to connect the results with the former ones by means of this formula, and, however interesting it would have been to preserve it, for the sake of its simplicity and of the confidence hitherto placed in it, it was found untenable.

On the other hand, the more complete formula, which contains the expression for the friction in the form of a function of the first and second degree of the mean velocity—

$$(av + bv^2)$$

was found to be most accurately satisfied by the data of observation.

The values, however, of the coefficients a and b still remained variable according to the diameters, and it was necessary to determine them for each diameter separately; but they were found to be constant for the same diameter with all velocities, and these were extended to 12 mètres (nearly 40 feet) per second.

The successive values of these coefficients a and b were subject to regular variations from one diameter to another, which were capable of geometrical representation by curves; and if these

* The chapter in this work on the "Theory of the Motion of Gaseous Fluids in Pipes" (2nd edition, p. 254), is a reprint of the article by Dr. Pole, published in the JOURNAL OF GAS LIGHTING in 1852, and hereafter more particularly referred to.

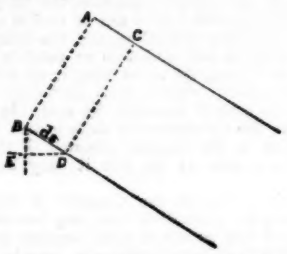
* The matter here alluded to is treated at considerable length in the original paper. It is sufficient here to give the general results arrived at.

curves are not susceptible of interpretation by simple algebraical expression, they at least may be considered as approximating closely thereto.

This obligation to retain in the general formula the term expressing the resistance due to the friction of the surface in terms of the first and second power of the velocity, does not present any difficulty. The theory of this question, laid down by M. Belanger in his "Cours de Mécanique," remains completely applicable, on the sole condition of preserving without simplification the expression of the resistance due to the friction. It is as follows:—

On the Permanent Motion of Gases in Cylindrical Tubes.

"We will assume, to simplify the question, that the motion takes place in parallel layers.



"Let a portion of the fluid be comprised between two sections AB, CD, the infinitely small interval between them, *ds*, being traversed in the time *dt*.

"The total pressure on the faces AB, CD, being ΩP and Ω (P + *d*P), the difference of level, BE, being = *dz*, and the weight of the gas per cubic mètre under the pressure P being π, it only remains, in order to apply the principle of motion of the centre of gravity, to take account of the longitudinal resistance of the pipe.

"By analogy with what takes place with liquids, we are led to consider that this force is proportional—1, to the surface of contact, χds; 2, to a function of the second degree of the mean velocity.

"It is also admitted that this force is proportional to the density of the gas, so that this force will be expressed by

$$\pi\chi ds\,(av + bv^2).''$$

It has been remarked above that experience has shown that this expression of the resistance must be preserved without simplification; but, on the other hand, the conditions of the problem allow us to suppress the algebraical complications due to the change of level. Pursuing, therefore, the solution of the question in those terms, and following M. Belanger—*i.e.*, starting from the equation which expresses that the increment of the quantity of motion is equal to the sum of the impulsions of the forces—we find

$$m\frac{dv}{dt} = -\Omega dP - \pi\chi\,(av + bv^2)\,ds;$$

substituting for m its value

$$\frac{\pi\Omega v dt}{g} \text{ or } \frac{\pi\Omega ds}{g};$$

also substituting

$$\frac{P^*}{K} \text{ for } \pi \text{ and } \frac{4}{D} \text{ for } \frac{\chi^*}{\Omega};$$

(D being the diameter of the conduit) the formula becomes

$$\frac{vdv}{g} = -\frac{K dP}{P} - \frac{4}{D}(av + bv^2)\,ds.$$

"The variables v and P have a simple relation to each other. The weight $\pi\Omega v$ or $\frac{P\Omega v}{K}$, discharged per second is constant; and since K and Ω are invariable for the extent of the conduit, it follows that Pv is constant.

"Let therefore

$$Pv = K',$$

it follows that

$$v = \frac{K'}{P} \text{ and } dv = -\frac{K' dP}{P^2};$$

substituting these expressions in the equation,

$$\frac{K'^2 dP}{gP^3} = KPdP + \frac{4}{D}bK'^2 ds + \frac{4}{D}aK'P ds.$$

"The term *ds* is not immediately integrable, because the value of the pressure P varies in the length of the conduit. But since the pressure P varies by only a small quantity in respect of its extreme values, we should only make an insignificant error in substituting for the variable P, the arithmetical mean between its values P_0 and P_1, taken at the two extremities of the pipe."

(We may further justify this solution by remarking that the product P*ds* is constant, since the volume corresponding to *ds* varies inversely as the pressure P.)

"Integrating on this hypothesis the last equation, putting L = length of pipe, we obtain—

$$2{\cdot}3026\frac{K'^2}{g}(\log P_1 - \log P_0) = \frac{K}{2}(P_1^2 - P_0^2) + \frac{4bK'^2L}{D} + \frac{4}{D}aK'L\frac{P_0+P_1}{2},$$

where, substituting for K′, its value P_1v_1, in which the pressure P_1 and the velocity v_1 are those at the inlet or outlet end, we find—

$$\frac{v_1^2}{2g}\left(\frac{8bgL}{D} + 4{\cdot}6052\log\frac{P_0}{P_1}\right) = \frac{K}{2}\left[\left(\frac{P_0}{P_1}\right)^2 - 1\right] - \frac{4L}{D}av_1\frac{P_0+P_1}{2P_1}, \quad (8)$$

in which formula

$$K = \frac{10334}{1{\cdot}293} \times \frac{(1+at)}{\delta} = \frac{7955}{\delta}(1+at).''$$

Solving with respect to v_0, which is effected by substituting for K′ the value P_0v_0, we arrive at an expression which has a more direct relation with the observed values of the volumes in the gasholder.

$$\frac{v_0^2}{2g}\left(\frac{8bgL}{D} + 4{\cdot}6052\log\frac{P_0}{P_1}\right) = \frac{K}{2}\left[1 - \left(\frac{P_1}{P_0}\right)^2\right] - \frac{4L}{D}av_0\frac{P_0+P_1}{2P_0}. \quad (8^*)$$

If, for facility, we represent

$$\frac{v_0^2}{2g}\frac{8bgL}{D} \ldots\ldots\ldots \text{ by } Ab,$$

$$\frac{4L}{D}av_0\frac{P_0+P_1}{2P_0} \ldots\ldots \text{ by } Ba,$$

$$\frac{v_0^2}{2g}4{\cdot}6052\log\frac{P_0}{P_1} \ldots\ldots \text{ by } Ca,$$

$$\frac{K}{2}\left[1 - \left(\frac{P_1}{P_0}\right)^2\right] \ldots\ldots \text{ by } D,$$

the formula 8* becomes

$$Ab + Ba + C = D.$$
$$Ab + Ba = D - C = E. \quad (9)$$

For another experiment on the same diameter, we should have—

$$A'b + B'a = E'. \quad (10)$$

From formula (9) we obtain—

$$a = \frac{E - Ab}{B}; \quad (11)$$

substituting for a its value in (10), we have—

$$b = \frac{E'B - B'E}{A'B - B'A}.$$

In this last formula all the quantities are known; from this, therefore, the value of b can be calculated, and by substitution in (11) that of a also. In this manner the values in the following table have been calculated:—

Diameter of Pipe.	Number of Experiments.	Value of a.	Value of b.	Nature of the Pipe.
0·500 m.	27	0·000020	0·000246	Cast iron.
0·325	31	0·000151	0·0C0326	"
0·254	4	0·000237	0·000359	"
0·103	7	0·000560	0·000480	"
0·081	10	0·000589	0·000489	"
0·050	5	0·000702	0·000595	"
0·050	4	0·000738	0·000345	Tin plate.

If with these values we trace curves, making the diameters represent the abscissæ, and the values of a and b the ordinates, it will be seen that the curves are very regular; and if they do not admit of a simple geometrical equation, they allow, at least, with sufficient certainty of the interpolation necessary to deduce the intermediate values and the values for diameters not experimented on, such as 0·600 and 0·700.

Influence of the Material and other Disturbing Causes.

It is necessary to observe that these coefficients have been determined for pipes of cast iron of ordinary lengths, with ordinary socket joints—such, in fact, as are ordinarily found in commerce. It is probable, however, that other conditions of length or of jointing would cause variations in the resistance.

The internal surface of the material of the pipe exercises, in all cases, an undeniable influence on the friction which the gas suffers in its contact, and every change in this condition will necessarily have a great influence on the loss of pressure.

A special experiment has been made on this subject with tubes of *tin plate* of 5 centimètres (nearly 2 inches) in diameter; it has also the object of connecting the experiments made by D'Aubuisson with those here recorded, and which gave greater resistance. It has shown that these differences of conditions have had a considerable influence on the result.

In the account that he gives, D'Aubuisson does not say how the pipes he tried were jointed. In order not to introduce any cause of error in the results, it has been endeavoured to realize in the most exact manner possible the diameter indicated, for which reason the pipes were jointed with external ferrules, which allowed

* χ represents the circumference, and Ω the area of the pipe; so that if D = diameter, $\frac{D\chi}{4} = \Omega$; K expresses the ratio between the pressure and density, which, according to Mariotte's law, is constant, the temperature being preserved the same.—TRANS.

the internal diameter to be continuously preserved with great precision.

Other observations, with equal conditions of diameter, of length, and of velocity, were made with cast-iron pipes of ordinary manufacture.

These two series of observations have reproduced the results observed and reported by D'Aubuisson, while they confirmed those derived from the new experiments with cast iron.

The influence of the surface on the friction of the gas is, therefore, proved incontestably. The following are the results:—

	Coefficient *a*.	Coefficient *b*.
Cast iron	0·000702	0·000593
Tin plate	0·000738	0·000345

The effect of this is to reduce the loss of pressure in pipes of tin plate to two-thirds of its value in those of cast iron.

(*To be continued.*)

Correspondence.

EFFECT OF VARIATIONS IN LEVEL UPON THE PRESSURE OF GAS IN MAINS.

SIR,—Your correspondent who calls himself "An Ignoramus" asks, at page 108 of your JOURNAL for the 18th of February, a very interesting question. In reply, however, I would state that in reality it is not a fact that the *true* pressure of the gas caused by the weight of the gasholder and the superincumbent atmosphere goes on increasing as the main ascends; on the contrary, it goes on diminishing. In like manner, the pressure of the atmosphere diminishes as the elevation increases, but in a different ratio from that of the gas. It is from this different ratio of decrease that the *apparent* pressure of the gas, as indicated by a pressure-gauge, increases as the main ascends; so that—to borrow a comparison from the science of astronomy—in the same manner as the *apparent* altitude of the sun varies from his *true* altitude by the refraction of the atmosphere, so the apparent pressure of the gas varies from its true pressure by the varying weight of the atmosphere. For example, suppose at the works the true pressure of the gas, as caused by the weight of the gasholder and superincumbent atmosphere, were equal to a column of water 30 feet in height, and the pressure of the atmosphere were equal to a column of water 29 feet 10 inches in height, the difference (two inches) would be the pressure as indicated by a pressure-gauge; and suppose that at a point in the main 100 feet more elevated the pressure of gas were equal to 29 feet 11 inches, and that of the atmosphere equal to 29 feet 8 inches, the difference (three inches) would be the pressure at this point as indicated by the pressure-gauge. The difference between these two indications of the pressure-gauge would be one inch, the net gain of pressure on a rise of 100 feet. I believe ninety-nine out of one hundred persons engaged in the manufacture of gas are aware that it is an advantage to have the works at the lowest level, but very few, I think, know the true reason for it. They say gas naturally ascends, which is just as philosophical as it would be to say, gas "abhors" the lowest level. The advantage of selecting the lowest level for the works arises from the circumstance that as the pressure is diminished by drawing the gas from the main by the consumers, so it is, in a measure, compensated for by the increase of pressure due to the ascending gradient of the main.

The supposition that the pressures at the top and bottom of a gasholder 50 feet high are equal, I think requires confirmation.

Kingsbridge, March 5, 1868. W. JARVIS.

SIR,—I am greatly obliged by your correspondents noticing my inquiry about the "variations of pressure," but I am not yet satisfied. I should like to ask "J. B." what "accidental openings" there exist in a gas-main to allow the atmosphere to exert its influence, or does he refer to the osmose of the main?

My question is simply this: Supposing (if it be possible) a glass tube of any diameter, 100 feet long, in an upright position, is filled with gas and hermetically sealed top and bottom; are we not aware, without the use of a gauge, that the pressure is greater on the sides of the tube at the top than at the bottom, and is that pressure due to atmospheric influence? And if it is, in what way does it act upon the gas within the tube?

March 10, 1868. IGNORAMUS.

ERRATUM.—In the first column of page 141, the 15th line from the bottom, for "a soft column of air," read "a 10-feet column of air."

Register of New Patents.

1748.—GEORGE M'KENZIE, of Glasgow, in the co. of Lanark, North Britain, for "*Improvements in the manufacture of illuminating gas.*" Patent dated June 15, 1867.

This invention relates to the manufacture of illuminating gas by means of a combination or mixture of coal and oil. Letters patent relating to the said manufacture have been already granted to the present patentee, dated March 15, 1866, No. 769; but in practically carrying out the invention described in the specification of the said letters patent some difficulty is experienced in charging the gas compound into the retorts from inconvenience in handling, and from the gas being very rapidly formed and becoming partially ignited, and thus wasted before the retorts can be closed; also when the whole of the coal is minutely pulverized the material has a tendency to be carried into and stop up the pipes and apparatus of the gas-works unless these are well adapted to the use of the compound, and unless the manufacture of the gas is conducted with great care. These difficulties are overcome or greatly diminished by the present improvements, which also possess other advantages.

One improvement consists in first thoroughly intermixing the mineral oil or any suitable oleaginous or fatty matter with only part of the coal intended to be used with it in making gas, and afterwards roughly combining the mixture thus formed with the remainder. Thus, if 30 gallons of oil are to be used with one ton of coal, as in the example of proportions described in the specification before referred to, then by the present invention the 30 gallons of oil are thoroughly intermixed with half a ton of coal in a pulverized state, or as obtained by sifting or riddling, and the compound or mixture thus obtained is afterwards added to or roughly mixed with the remaining half ton of coal, the latter being in its ordinary state—that is to say, not pulverized. One obvious advantage of this process is the economy in the cost of grinding the coal. In mixing the pulverized coal with the oleaginous or fatty matter it is preferred to effect the operation in the manner indicated in the earlier specification hereinbefore referred to, but it may be effected in any other way.

By a second improvement the quantity of oleaginous or fatty matter mixed with the pulverized coal may be varied, and the mixture thus produced may be mixed with common coal or other coal used in gas-making in such proportions as may be necessary to produce the quantity and quality of gas required. Thus one ton of coal minutely pulverized with, say, 60 to 70 gallons of oil produces a material capable of giving gas of a very high illuminating power and of extra quantity per ton; or thus, if a material capable of giving gas of less illuminating power and less in quantity per ton be desired, then a less quantity of oil will be intermixed in the combination proportionate to the diminished illuminating power and quantity of gas desired. The material formed by the said composition of minutely pulverized coal and oil will for use be roughly intermixed with either the common bituminous coal or other gas-making coals in such proportion as may be desired to secure gas of the illuminating power and quantity required.

By a third improvement, gas obtained from any of these compounds, when used in retorts by themselves, may be mixed with gas obtained from common coal or from "cannel" or similar coals produced in other retorts.

By a fourth improvement, when it is desired to only slightly increase the illuminating power of gas obtained from common bituminous coal, or from such coal mixed with more or less "cannel" or similar coal, then mineral oil or other oleaginous or fatty matter is added to or roughly mixed with the coal, without the latter being specially pulverized, but only in proportions not exceeding 15 gallons of the oil to every ton of coal.

By a fifth improvement, about 60 lbs. of common resin are added to every ton of any of the compounds or mixtures hereinbefore described or referred to, in order to increase the illuminating power, the resin being by preference ground with the coal.

The improved gas compounds prepared as hereinbefore described are treated for the obtainment of illuminating gas precisely like the ordinary gas coal used for that purpose, that is to say, any one of the compounds is put into gas-retorts of iron or fire-clay such as are at present in use, and the distillation or decomposition is effected in the ordinary way, it being necessary to remark in connexion therewith merely that it is advantageous to employ a strong heat, never less than a bright red heat, but a white heat or nearly so.

1791.—EBENEZER WILLIAM HUGHES, of 5, Queen Square, Westminster, and THOMAS HOWARD HEAD, of 9, Dowgate Hill, in the City of London, for "*Improvements in rotary engines and pumps.*" Provisional protection only obtained. Patent dated June 19, 1867.

The object of this invention is to produce a complete rotary engine which maintains the action and reaction always the same, and all the pressure that is employed therefore effective, the pressure of the power always acting continuously, according to the area of the piston and the pressure employed. In carrying out the invention an annular cylinder is employed, in which rotates a piston or pistons, and concentric with which also rotates a centre-piece. At any one part of the internal periphery of the cylinder a piece is either cast on or fitted in, touching the internal centre-piece, and forming a joint therewith. The piston or pistons on the turning of the machine retires into the centre-piece on coming to the cam on the internal periphery (in which are also the eduction and induction ports), and on passing, such cam is forced out again, either by spring, or by water, steam, or other pressure.

1819.—GEORGE DICKIE, of Kilwinning, in the co. of Ayr, N.B., for "*Improvements in the manufacture of illuminating gas.*" Patent dated June 21, 1867.

This invention has for its object the obtaining of illuminating gas from oils, more especially those of the mineral hydrocarbon class. To effect this object, the oil or oils to be converted into gas are admitted into a highly heated retort, tube, or other vessel, the temperature of which at once causes the conversion of the oil into a permanent gas of high illuminating power. What is considered to be the novel feature of the invention is the use of small retorts, by preference made of malleable iron raised to such a temperature as will produce from 80 to 120 cubic feet of gas from one gallon of oil. It is found that if a greater quantity of gas than 120 feet per gallon is produced it loses in illuminating power. By using such retorts raised to a higher temperature than can be safely employed with other retorts at present in use, large quantities of gas are produced in a shorter time and with

a less expenditure of fuel than hitherto obtained, thus enabling the production of illuminating gas from mineral hydrocarbon oils to be carried on more economically than hitherto.

1820.—George Simpson, of Whitburn, in the co. of Linlithgow, N.B., for "*Improvements in charging and emptying retorts, and in the machinery or apparatus employed therefor.*" Provisional protection only obtained. Dated June 21, 1867.

According to this invention, the range of retorts is built in the ordinary manner, and a frame is made for each retort that fits into and rests upon the bottom. Each frame has a set of trays, which trays are hinged to the frame at one side, the trays being used for containing the material with which the retort is to be charged. In front of this retort one or more travelling frames is or are situated, any one of which may, at any time, be moved to any one retort of the series; its upper side is level with the bottom of the retorts, so that the frame and trays may be drawn out from the retort; as the trays pass over a plate at its back end, they fall over on the hinge joints, and discharge their contents, and, on being again put into the retort, the trays, as they pass over the plate before referred to, are thereby again lifted to their horizontal position, in which position, as they pass into the retort, they are discharged by means of a belt of elevators, which discharge a certain quantity of the substance to be distilled into each tray; when the frames and trays are passed into the retort, its mouth is closed, and the distilling process is carried on in the ordinary manner. The frame and trays are drawn in and out by chain gearing, and this and the elevator are actuated by a steam-engine or other prime mover.

1821.—Francis Reddicliffe, of Seglenlas Mine, Llanidloes, in the co. of Montgomery, mine agent, for "*Improvements in buckets for pumps, especially suitable for pumps for mines, and in pistons for steam and other engines.*" Patent dated June 21, 1867.

This invention consists of certain mechanical arrangements whereby the packing of the pistons of steam or motive-power engines or pump buckets are adjusted as the same wears away. This is effected by placing two plates or rings of metal one above the other, and connecting them together by distance pieces. Upon the faces of these plates, which stand toward each other, are protuberances, so disposed that they do not stand opposite each other, but in directions between one another, and each extends for half the space between the two plates. The packing pieces or gearing are introduced into the apertures between the protuberances; they are made to fit water-tight, and to overlap each other at the ends. Each packing piece carries an arm projecting inwards, and furnished with a ruck. These rucks are so disposed as to receive a pinion between them, whereby the packing may be adjusted as it wears. The pinion carries a fork, and when the packing is to be adjusted, the rods are disengaged from the engine at the top of the pump, and the bucket lowered on a bar near the bottom of the working barrel. The fork crossing the bar will keep the pinion in position, and the bucket, being turned by the rods, will be equivalent to turning the pinion, and the packing or gearing will thus be adjusted. The bucket can then be drawn up clear of the bar, and set to work.

1822.—Emory M'Clintock, of the Langham Hotel, in the co. of Middlesex, gentleman, for "*Improvements in the construction of motive-power engines and pumps.*" Patent dated June 21, 1867.

This invention relates to a peculiar construction of double-cylinder engine and pump, by which the piston of each cylinder is made to act as a four-way distribution-valve for the other cylinder.

The novelty of the invention is in the employment of a double-acting cylinder and piston, serving also respectively as valve-box and valve in combination with one other similar cylinder with its piston. The two cylinders and their pistons are so arranged that the piston of each cylinder shall act as a valve to govern the distribution of steam or other fluid or liquid for the other cylinder. The pistons of the two cylinders are connected together either by a shaft with cranks or eccentrics, or by any other ordinary mechanical device, so that one of them shall have completed its stroke when the other is at or near half stroke, and *vice versâ*. It is preferred to employ pistons and cylinders nearly similar in size and arrangement, although such resemblance is not by any means essential. Besides the ports or openings for its own supply and exhaust (which communicate with certain of the ports of the other cylinder), each cylinder has four or more additional openings, of any convenient shape and position, except that these additional openings cannot be placed in the ends of the cylinder. One or more of these additional openings will communicate with the supply-pipe, one or more with the exhaust-pipe, one or more with the upper or first chamber of the other cylinder, and one or more with the lower or second chamber of the same. The piston is of such length as to keep these additional openings separated at all points of its stroke from any communication with the chambers of its own cylinder above and below it, and also so shaped that, when at the middle of its stroke, there shall be no passage for the steam (or at least for any considerable quantity) through these openings in any direction. Passages are made through or around the piston, and are so arranged that when it moves in one direction from the central position and until it returns to the same position there shall be communication for the passage of steam between the above-mentioned supply port or ports, or any of them, and the above-mentioned port or ports communicating with the upper or first chamber of the other cylinder, or any of them, and also between the above-mentioned port or ports communicating with the lower or second chamber of the other cylinder, or any of them, and the above-mentioned exhaust port or ports, or any of them, thus causing the piston of the other cylinder to make a complete stroke. When the piston moves in the other direction from the central position, and until it returns to the same position, communications the reverse of the above will be established, and will produce the return stroke of the piston of the other cylinder. Conversely the other cylinder with its piston is constructed upon the same principles, so as to regulate the distribution of steam for the cylinder first mentioned. A convenient reversing arrangement consists in the addition of a valve or valves, by which the steam may be made to flow in the opposite direction through the engine.

APPLICATIONS FOR LETTERS PATENT.

674.—James George Stidder, of Hanover Street, Long Acre, in the co. of Middlesex, engineer, for "*Improvements in water-closets, lavatories, and urinals, and in regulating supplies for same by water-valves.*" (Complete specification.) Feb. 28, 1868.

676.—Richard Howard, of the town and co. of the town of Southampton, corn factor, for "*Improvements applicable to taps and cocks for various useful purposes.*" Feb. 28, 1868.

704.—Henry Wilson, of Stockton-upon-Tees, in the co. of Durham, for "*Improvements in meters, valves, and cocks, for measuring, regulating and discharging liquids, gases, or fluids.*" March 2, 1868.

706.—William Rollo, of Dundee, in the co. of Forfar, N.B., for "*Improvements in the arrangement and construction of water-closets.*" March 2, 1868.

708.—William Edward Newton, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improved apparatus for burning hydrocarbons for heating purposes.*" A communication. March 2, 1868.

715.—Charles Cochrane, of Woodside Iron-Works, near Dudley, in the co. of Worcester, for "*Improvements in valves or dampers for pipes, passages, or flues serving to conduct gases at high temperatures.*" March 3, 1868.

727.—George Anderson, of Northumberland Street, Strand, in the co. of Middlesex, gas engineer, for "*Improvements in apparatus for moulding and compressing substances for artificial fuel.*" March 3, 1868.

744.—William Knox Stuart, of Glasgow, in the co. of Lanark, N.B., chemist, for "*Improvements in arrangements and apparatus for dealing with and utilizing sewage.*" March 4, 1868.

747.—George Davies, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, and 87, St. Vincent Street, in the city of Glasgow, civil engineer and patent agent, for "*Improvements in the manufacture of gas for lighting and heating.*" A communication. March 4, 1868.

770.—Alexander Melville Clark, of 53, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in steam-pumps.*" A communication. March 5, 1868.

802.—Edward Casper, of 101, Cannon Street, in the City of London, merchant, for "*An improved apparatus for raising and forcing liquids, more especially designed for supplying water to steam-boilers.*" A communication. March 7, 1868.

810.—Augustus Fraser Baird, of Pimlico, in the co. of Middlesex, lieutenant-colonel in the Bengal Staff Corps, for "*Improvements in earth-closets, applicable also to urinals.*" March 9, 1868.

817.—Philip Fanckes Halbard, of Burton-on-Trent, in the co. of Stafford, for "*Improvements in stench-traps.*" March 9, 1868.

820.—William Barns Kinsey, of 92, Cannon Street, in the City of London, engineer, for "*Improvements in apparatus for carburetting or increasing the illuminating properties of coal gas.*" March 10, 1868.

824.—Robert Meldrum, of Pittormie, Cupar, in the co. of Fife, N.B., for "*Improvements in apparatus for raising water.*" March 10, 1868.

839.—Samuel Naylor, of Ravensfleet, in the parish of East Stockwith, in the co. of Lincoln, engineer to the Morton Carr Drainage Proprietors, for "*Improvements in apparatus for raising water.*" March 11, 1868.

GRANTS OF PROVISIONAL PROTECTION.

410.—Christopher Brakell, of Windsor Road, Oldham, in the co. of Lancaster, engineer, for "*Improvements in apparatus for measuring fluids.*" Feb. 6, 1868.

471.—Henry Stracey Barron, of 2, Alexandra Terrace, Barking Road, parish of West Ham, co. of Essex, mechanical draughtsman, for "*Improvements in double-action reciprocating pumps, by which the usual suction and delivery valves are dispensed with, and their functions performed by means of a sliding action of the barrel.*" Feb. 12, 1868.

545.—John Kirkland, of Liverpool, in the co. of Lancaster, engineer, for "*Improvements in the construction of pumps.*" Feb. 19, 1868.

554.—George Pomeroy Dodge, of 79, Upper Thames Street, in the City of London, india-rubber manufacturer, for "*Improvements in the manufacture of india-rubber valves, valve-seats, and other similar articles.*" Feb. 19, 1868.

557.—James Grafton Jones, of the Blaina Iron-Works, near Newport, in the co. of Monmouth, for "*Improvements in machinery for exhausting air, suitable to be used for ventilating mines, and for other similar purposes.*" Feb. 19, 1868.

566.—Pierre Nicolas Goux, of 49, Rue de Longchamps, Paris, in the empire of France, agricultural proprietor, for "*Improvements in collecting and in disinfecting human excreta and converting the same into manure, also in the apparatus or means employed therein.*" Feb. 20, 1868.

572.—George Davies, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, and 87, St. Vincent Street, in the city of Glasgow, civil engineer and patent agent, for "*Improvements in taps.*" A communication. Feb. 20, 1868.

576.—George Davies, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, and 87, St. Vincent Street, in the city of Glasgow, civil engineer and patent agent, for "*Improvements in the manufacture of gas for lighting and heating.*" A communication. Feb. 21, 1868.

588.—Augustus De Metz, of Wolverhampton, in the co. of Stafford, for "*Improvements in commode-pots or vessels to be used as water-closets, or for other purposes.*" Feb. 22, 1868.

596.—Benjamin Edward Reina Newlands, F.C.S., of 4, Malvern Terrace, Charlton, in the co. of Kent, for "*Improvements in treating spent oxide of iron, or oxide of iron which has been used in gas-works or otherwise, to separate sulphur from sulphuretted hydrogen, and in the purification of sulphur obtained from such oxide of iron.*" Feb. 22, 1868.

611.—William Edward Newton, of 66, Chancery Lane, in the co. of

Middlesex, civil engineer, for "*Improvements in the manufacture of illuminating gas.*" A communication. Feb. 24, 1868.

613.—George Sinefi Dracopulo, of Cardiff, in the co. of Glamorgan, for "*A new apparatus for raising or forcing water, applicable to ships, mines, and other purposes.*" Feb. 24, 1868.

617.—Henry Defries, of the firm of Jonas Defries and Sons, of Houndsditch, in the City of London, manufacturer, for "*Improvements in the manufacture of opal or glass lamps and glass globes, chimneys, and shades of every description.*" Feb. 25, 1868.

634.—George Tomlinson Bousfield, of Loughborough Park, Brixton, in the co. of Surrey, for "*Improvements in apparatus for raising and forcing water and for feeding steam-boilers.*" A communication. Feb. 25, 1868.

643.—Robert Laidlaw and John Thomson, both of Glasgow, in the co. of Lanark, N.B., engineers, for "*Improvements in apparatus for exhausting gas for blowing air, for pumping or forcing liquids, and for measuring liquids.*" Feb. 26, 1868.

648.—Frederick Lambe and Arthur Charles Sterry, both of Rotherhithe New Road, in the co. of Surrey, paraffin refiners, and John Fordred, of Blackheath, in the co. of Kent, chemist, for "*Improvements in purifying hydrocarbon oils.*" Feb. 26, 1868.

676.—Richard Howard, of the town and co. of the town of Southampton, corn factor, for "*Improvements applicable to taps and cocks for various useful purposes.*" Feb. 28, 1868.

INVENTIONS PROTECTED FOR SIX MONTHS BY THE DEPOSIT OF A COMPLETE SPECIFICATION.

658.—Charles Clement Walker and William Thomas Walker, of Midland Iron-Works, Donnington, near Newport, Shropshire, engineers, for "*Improvements in centre-valves for gas-purifiers and other apparatus.*" Feb. 27, 1868.

674.—James George Stidder, of Hanover Street, Long Acre, in the co. of Middlesex, engineer, for "*Improvements in water-closets, lavatories, and urinals, and in regulating supplies for same by water-valves.*" Feb. 28, 1868.

NOTICES TO PROCEED.

2968.—James White, of Great Portland Street, in the co. of Middlesex, for "*Improvements in means for ventilating buildings and other places.*" Oct. 22, 1867.

3014.—George Dorsett, Edward Dorsett, and John Bennington Blythe, all of London Street, in the City of London, merchants, for "*Improvements in the mode of and apparatus for burning the gases arising from the distillation of liquid hydrocarbons, and also in economizing fuel by the said process.*" Oct. 26, 1867.

3027.—William Payne and Alexander Black Fraser, both of Liverpool, in the co. of Lancaster, general founders, and ships ironmongers, for "*Improvements applicable to ships and other pumps.*" Oct. 28, 1867.

3047.—William Bishop, engineer, and Benjamin Burningham, builder, both of Pratt Street, Camden Town, in the co. of Middlesex, for "*Improvements in apparatus for preventing effluvia entering tanks or cisterns from the waste-pipe.*" Oct. 29, 1867.

3062.—Robert Clegg, of Islington, in the co. of Middlesex, engineer, for "*Improvements in the construction of pumps.*" Oct. 31, 1867.

3069.—William Robert Lake, of 8, Southampton Buildings, Chancery Lane, in the co. of Middlesex, consulting engineer, for "*An improved mode of and apparatus for exhausting or rarefying the air in vessels for food-preserving, distilling, and other purposes.*" A communication. Oct. 31, 1867.

3171.—Mark Rollason, of Birmingham, in the co. of Warwick, modeller, for "*Improvements in suspended gas-lamps.*" Nov. 9, 1867.

3179.—William Payne, of Birmingham, in the co. of Warwick, engine-fitter, for "*Improvements in clack and bucket door-pieces for pumps.*" Nov. 11, 1867.

3219.—Alfred Vincent Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in rotary engines, applicable as motors, pumps, meters, and for other purposes, also in indicators applicable to such and other engines or meters, and other purposes.*" A communication. Nov. 13, 1867.

3590.—William Armand Gilbee, trading under the name of L. de Fontaine Moreau, of 4, South Street, Finsbury, in the co. of Middlesex, patent agent, for "*Improvements in the method of and apparatus for raising water.*" A communication. Dec. 17, 1867.

182.—Auguste Bochkoltz, of the city of Vienna, in the empire of Austria, civil engineer, Inspector-General of Railways, for "*An improved mechanical arrangement to be employed in connexion with self-acting valves.*" Jan. 18, 1868.

238.—David Yoolow Stewart, of Glasgow, in the co. of Lanark, N.B., ironfounder, for "*Improvements in the manufacture of cast-iron pipes and similar articles, and in the moulds and arrangement of apparatus connected therewith.*" Jan. 23, 1868.

257.—Thomas Lesslie Gregson Bell, of Plaistow, in the co. of Essex, for "*Improvements in preparing oxide of iron for purifying gas, and in treating the oxide of iron residues to obtain products therefrom.*" Jan. 24, 1868.

274.—Alfred Middlemist, of Saville Street, Hull, in the co. of York, for '*An improved apparatus for increasing, regulating, and controlling the heat and draught in stoves and other fireplaces.*" Jan. 27, 1868.

311.—David Law, ironfounder, and John Wharrie, foreman, both of Glasgow, in the co. of Lanark, N.B., for "*Improvements in the manufacture of cast-iron pipes and similar articles, and in apparatus therefor.*" Jan. 29, 1868.

357.—Clinton Edgcumbe Brooman, of the firm of Robertson, Brooman, and Co., of 166, Fleet Street, in the City of London, patent agents, for "*Improvements in steam and water valves, cocks, and faucets.*" A communication. Feb. 3, 1868.

438.—William Thomas Sugg, of Vincent Works, Vincent Street, in the city of Westminster, for "*Improvements in valves.*" Feb. 8, 1868.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

237.—James Hind, "*Improvements in the construction of pumps for lifting and forcing liquids.*" Jan. 27, 1865.

288.—Alexander Southwood Stocker, "*Improvements appertaining to reflectors.*" Feb. 2, 1865.

311.—Frank Clarke Hills, "*Improvements in effecting the combustion of fuel in the furnaces of steam-boilers and the fireplaces of stoves, and of gas in gas-burners, and in apparatus connected therewith.*" Feb. 4, 1865.

314.—William Clark, "*An improved combustion-pump.*" Feb. 4, 1865.

342.—Romain De Bray, "*An improved reflecting apparatus for street and other lamps.*" Feb. 7, 1865.

344.—William Sim, "*An improved method of and improvements in apparatus for extracting gases from mineral oils, and employing the same for illuminating purposes.*" Feb. 7, 1865.

433.—Charles Lungley, "*Improvements in ventilating blinds or screens, and in means of ventilating ships and vessels.*" Feb. 15, 1865.

447.—William Edward Newton, "*Improvements in apparatus for distilling petroleum and other volatile liquids, and for making gas.*" Feb. 16, 1865.

547.—Comyn Ching, "*An improved fluid-valve.*" Feb. 27, 1865.

549.—William Sim, "*An improved method of extracting gases from mineral oils, and in employing the same for illuminating and heat-producing purposes, and in the machinery or apparatus connected therewith.*" Feb. 27, 1865.

568.—Thomas Slocombe Hall, "*Improvements in gas-burners.*" Feb. 28, 1865.

611.—Richard Archibald Brooman, "*Improvements in machinery for obtaining motive power from ammoniacal gas.*" March 4, 1865.

Parliamentary Intelligence.

HOUSE OF LORDS.

THURSDAY, MARCH 5, 1868.

The Lord Chancellor acquainted the House that the Standing Orders applicable to the Wellingborough Water Bill have been complied with.

FRIDAY, MARCH 6.

The Calverley and Horsforth District Gas; Lewes Water; Morley Gas; Yeadon and Guiseley Gas; and the Leeds New Gas Bills were committed.

THURSDAY, MARCH 12.

The Leeds New Gas Bill was committed.

HOUSE OF COMMONS.

SATURDAY, FEB. 29, 1868.

Petitions were deposited against the Dundee Gas (No. 1), from the Dundee New Gaslight Company and the Dundee Gaslight Company;—against the Dundee Gas (No. 2), from the Dundee New Gaslight Company and the Dundee Gaslight Company;—against the Maryport District and Harbour, from the Dearham Colliery Company and others;—against the Portsmouth (Borough) Water, from the London and South-Western, and London, Brighton, and South Coast Railway Companies;—and against the St. Mary Church Local Board Bills, from Sir Laurence Palk, Bart.

THURSDAY, MARCH 5.

The Maryport Improvement and Harbour, and the Windsor and Eton Water Bills, were read a second time, and committed.

The Sligo Borough Improvement Bill was read a first time.

The Metropolis Gas Bill was presented, read a first time, and referred to the Examiners of Petitions for Private Bills.

A petition was deposited against the Burslem and Tunstall Gas Bill, from the Burslem District Board of Health.

FRIDAY, MARCH 6.

Petitions were deposited against the Maryport District and Harbour, from Lord Leconfield;—against the Maryport Improvement and Harbour, from Joseph Pocklington Senhouse and Elizabeth Senhouse, the trustees for the District and Harbour of Maryport, and from ratepayers of Maryport, and others;—against the Sligo Borough Improvement, from the Midland Great Western Railway of Ireland Company;—and against the Windsor and Eton Water Bills, from the Corporation of New Windsor.

SATURDAY, MARCH 6.

Petitions were deposited against the Maryport District and Harbour, from the London and North-Western Railway Company;—against the Maryport Improvement and Harbour, from the London and North-Western Railway Company, and the mortgagees of tonnage rates connected with the harbour of Maryport;—and against the Windsor and Eton Water Bills, from owners, &c., of property, and inhabitants, &c., of Slough, &c.; and from William George Nixey and others.

TUESDAY, MARCH 10.

The Wellingborough Water Bill was read the first time.

A petition was deposited against the Bradford Water-Works and Improvement Bill, from the owners and ratepayers in Keighley.

WEDNESDAY, MARCH 11.

The Sligo Borough Improvement Bill was read a second time, and committed.

FRIDAY, MARCH 13.

Petitions were deposited against the Sligo Borough Improvement Bill, from Moses Monds; the Sligo Gaslight and Coke Company; and Owen Wynne.

SATURDAY, MARCH 14.

A petition was deposited against the Sligo Borough Improvement Bill from the owners and occupiers of property in Sligo.

Legal Intelligence.

THE ALLEGED GAS NUISANCE AT DOVER.

At the Kent Lent Assizes, Maidstone, on Thursday last, the cause between the Dover Local Board of Health, plaintiffs, and the Dover Gas Company and Messrs. Anderson and Jones, defendants, for an alleged nuisance committed at their works at Buckland, came on for hearing. The Hon. G. DENMAN, Q.C., Mr. BRIDGES, and Mr. MEADOWS WHITE, instructed by the town-clerk, appeared for the Local Board of Health; Mr. Serjeant BALLANTYNE and Mr. ARCHIBALD, instructed by Mr. G. Fielding, appeared for the gas company; and Mr. HAWKINS, Q.C., Serjeant PARRY, and Mr. POLAND, Q.C., instructed by Mr. Keily, of 37, Brunswick Square, appeared for Messrs. Anderson and Jones.

A special jury had been empannelled by the plaintiffs to try the cause, the judge being the Lord Chief Justice COCKBURN.

The case was opened by the Hon. G. DENMAN, and the circumstances connected with it were said to have transpired since the 1st of January, 1867. The first count of the indictment was for committing a nuisance in the manufacture of gas; the second, for commiting a nuisance in the purification of gas; and the third, for removing residuary and objectionable substances from the gas-works.

Mr. HAWKINS requested his lordship to bear with them for a few minutes, as there was a proposition for the cause to be arranged, mentioning that if an arrangement were not then effected it was probable the trial would not be terminated for at least two days. This arose from the fact that there were, on both sides, as many as 50 witnesses from Dover and about 20 from London, the briefs comprising some 120 folios.

After a consultation for about 30 minutes,

Mr. HAWKINS informed his lordship that the following arrangement had been come to:—"That the jury should be discharged; that Dr. Olding should say whether, during the last year, or any part thereof, the works had been conducted in a manner reasonably calculated to avoid nuisance—if not, the defendants, Messrs. Jones and Anderson to pay such an amount of the costs of prosecution as Dr. Odling should direct; that these terms should be embodied in a rule of the court, the present indictment not to be tried again."

It will be seen from the above terms the indictment is wholly abandoned, the proposal to withdraw having emanated from the prosecution.

In a letter from Messrs. Anderson and Jones to the local board, in answer to a complaint about the quality of the gas, dated Jan. 7, 1868, it will be remembered that they remarked—"In stating that the gas supplied from these works is second to none in the county for purity, and is above the parliamentary standard, we are desirous that some steps should be taken to test the truth of this statement, and we shall give every facility for such test being made."

With respect to the nuisance complained of, and for which the prosecution was entered into, the terms proposed by the local board on the 13th of Feb., 1868, were as follows:—

1st.—That a judgment should be signed by mutual consent.

2nd.—That no steps should be taken upon the judgment for a period of two months.

3rd.—That if within that period the cause of nuisance complained of were not remedied to the satisfaction of the surveyor of the local board, or at at any time after that period the nuisance should be repeated and again complained of, the board should be at liberty to move the Court of Queen's Bench to issue an order for damages, or to pass such sentence as to the judge might seem fit, and should be allowed to call in such evidence on either side as he might deem proper.

4th.—That the company should pay, when demanded, all the costs of proceedings in the matter.

These proposals the defendants considered very unfair, and in return offered to accept terms very similar to those which were now proposed by the counsel for the prosecution, as will be seen by an extract from a letter written by Mr. G. Fielding to the local board on the 19th of February:—

"The directors offer to enter into a written agreement with the board to submit their works and mode of manufacture to the scrutiny of any of the following gentlemen, of whose ability and impartiality there can be no question—viz., Dr. Letheby (the medical officer of the City of London), Thomas Hawksley, Esq., C.E., or Dr. Odling, of London, and to bind themselves to provide any further addition to their plant, and carry out any alteration in the mode of manufacture, which such referee may direct. By the adoption of this suggestion, a more practical solution of all that is complained of will be obtained than through a court of law."

This proposition the local board, at their meeting on the 20th of February, unanimously rejected, and the indictment was consequently allowed to proceed.

After issue had been joined, and after the briefs had been delivered to the various counsel, the town-clerk offered to defer the proceedings if the defendants would undertake to pay his costs; but Messrs. Anderson and Jones declined to do anything of the kind, or to admit any liability whatever, but offering at the same time to refer the matter to an efficient scientific gentleman.

In consequence of this proposal, some correspondence took place between Mr. Keily, attorney for Messrs. Anderson and Jones, and Mr. G. Fielding, secretary of the gas company, in which it was urged by the former that the gas company were altogether the wrong parties to have been proceeded against, and that the prosecution should receive notice of such an objection, so that the costs of the company's defence might be fixed upon them. This, however, was not done; and the proceedings have entirely ceased upon the agreement that Dr. Odling shall inspect the gas-works at Buckland, and determine whether, during the last twelve months, the defendants manufacture of gas has been conducted in a manner reasonably calculated to avoid any nuisance.

THE SUPPLY OF GAS TO THE TOWN OF WEYMOUTH.

(*In arbitration—Before Mr. Serjeant* HAYES, *Umpire; and* T. G. BARLOW, *Esq., and* ALFRED PENNY, *Esq., Arbitrators.*)

(*Continued from page* 113.)

TOWN-HALL, WEYMOUTH—THURSDAY, DEC. 5, 1867.

SECOND DAY.

Mr. *F. Waters* recalled, and examined by Mr. DAVISON.

The quantity of gas registered for the year ending March 31, 1867, was 20,170,000 cubic feet. Of that quantity 14,976,000 cubic feet were sold by meter.

Mr. LLOYD: Of course it is assumed that this is simply from the books you are speaking, and not from your own knowledge?

Witness: From personal knowledge.

By the UMPIRE: If I take the index of the meter on the 31st of March one year and the next, and know the quantity of gas made, that is personal knowledge.

Examination resumed: The quantity of gas supplied to the public lamps was 3,337,000 cubic feet. That leaves 1,857,000 feet unaccounted for, which is about 9 per cent. of the whole. The gross receipts for gas-rental for the same year were £4832 12s. 1d.

By Mr. BARLOW: That includes public lights.

Examination resumed: For gas supplied by meter we received £4118 11s. 9d., and for public lamps £551 16s. 4d.

By Mr. LLOYD: I am speaking from the book in this case.

Mr. LLOYD (to Umpire): You see, sir, we have better evidence than this, because Mr. Burdon was to have accounts sent to him.

Witness: The books are in existence.

Mr. LLOYD: Let us have them in.

Mr. DAVISON: Those are the books showing the collection of the meter-rental.

Mr. LLOYD: They are supposed to be accessible.

Examination resumed: The meter-rents were £162 4s., making a total of £4832 12s. 1d. The coke sold in the same year amounted to £810. I took that from the original book. [Book handed to Mr. Lloyd.]

Mr. PENNY: Do you mean that the item of coke includes all the breeze that was sold? I do not see how you can make it £810.

Mr. BARLOW: It is 810 tons.

Mr. PENNY: We both understood you to mean £810.

Examination resumed: The coke, at 15s. per ton, produced £617 10s.; breeze, 6650 bushels at 2d., £55 8s. 4d.; tar, 6789 gallons at 3d., £84 17s. 3d., and 1200 gallons at 2½d., £14 10s.; lime, 1000 bushels at 6d., £25. Those are the quantities sold, producing £785 5s. 7d. There were in stock 80 tons of coke at the same price, equal to £60; breeze, 1000 bushels at 2d., £8 6s. 8d.; tar, 12,171 gallons, which were sold at 1½d.

Mr. DAVISON: You say, "Which were sold."

Witness: They have been sold to Mr. Burdon at those prices. That is £114 14s. 5d., and £63 7s. 9d for tar.

Mr. LLOYD: I cannot admit this stock unless you give me the quantity on hand at the beginning of the year.

Witness: I cannot give you the quantity of stock at the commencement of the year. If you put that quantity, 1279 gallons, to the other tar that was sold at 2d. and at 2½d., it will make up the whole quantity of tar sold during the year.

Mr. LLOYD: Then there was none at all in stock at the beginning of the year?

Witness: There was a large stock at the beginning of the year, but I sold some, and when Mr. Burdon took to the stock there were about 115,000 gallons. Of course, every year the stock had accumulated.

Mr. DAVISON: That 1279 gallons is applicable to the period you are speaking of. My learned friend asks you, are you enabled to say from the accounts you have of the previous years that what you have told us is the production of the year you have been speaking of, and that only?

Witness: I have not got the quantity of tar.

Mr. DAVISON: Now go to the working expenses for the same year. Let us have the quantity of coals.

By Mr. LLOYD: I got the working expenses from the wages and other books kept for the purpose.

The UMPIRE: Take the first item you are going upon—the coals. There are 2240 tons of coals. How did you get at that quantity?

Witness: At the commencement of the year—that is, on the 1st of April, 1866—there were 50 tons in store.

By Mr. LLOYD: I got that item from the quantity of stock at that time. There was so much coal purchased, and so much used during the year.

Mr. LLOYD: But I want to know how you know there was that in stock.

Witness: By calculation. I got at the quantity of coal purchased during the year from the invoices. I have a copy of them. The originals have been burnt. I know from Mr. Church that the payments were made by cheques. I have neither got the cheques nor the counterfoils, nor do I know where they are. I saw them some time in June.

Mr. LLOYD: Were they burnt? Now, mind what you are saying.

Witness: I will not say they were burnt. I cannot swear that they were, but they were put in with other papers to be burnt. I put them in myself.

Mr. LLOYD: Did the bank-books and cheque-books relate only to the gas-works, or to the general expenditure of Mr. Church?

Witness: To the general expenditure. They were burnt because they were of no further use. His bankers pass-book is still in his possession.

Mr. DAVISON: Is this not a little outside the mark? We are not now upon this book which the witness has in his hands—which he accounted for most satisfactorily yesterday—but on another book, which is not his book.

Mr. LLOYD: Pardon me, we are to have the best evidence.

The UMPIRE: He kept the books at the place, but he did not keep the bankers or the cheque book.

Mr. LLOYD: This is not a book he kept there at all.

The UMPIRE: The coals came in with an invoice, I presume. They were then entered in a book?

Mr. LLOYD: Did the invoices go into a book? Was there a purchase-book before this wholesale destruction?

Witness: No.

By the UMPIRE: Every time a cargo of coals came in there were invoices, which were filed; then a bill came for acceptance, which was entered, and we could thus tell the amount paid for coals.

By Mr. LLOYD: I went through those invoices and cheques last March or April. I had never done so before. We knew what the cost was. Those invoices were kept in the office—in one of the drawers. I am not aware there are any still in existence; I put them aside to be destroyed.

Mr. LLOYD: How was this abstract made? How did you get at the 2240 tons as the quantity of coal.

Witness: The first of it is in 1866: there were then 50 tons in stock. Do you want all the details throughout?

Mr. LLOYD: No; I want to know where you got those items from.

Witness: From the invoices. I put down all the invoices that came in that year. That was the only year I did it. There are no accounts of the purchases of any previous year that I am aware of.

Mr. DAVISON: Tell us what the quantity was.

Witness: The quantity purchased during the year.

Mr. DAVISON (to the Umpire): You see, sir, I do not know what we can do more than this. Mr. Church and Mr. Waters are not our witnesses. You shall have all the evidence we can give you. All the seaborne coal was bought of Mr. Burdon.

Witness: Except a small quantity from Frome. We have lately got a copy of the statement of all the coals shipped by Mr. Burdon during the last three or four years, which exactly agrees with this statement. Mr. Howard has that document.

Mr. LLOYD: You must be more particular about this case, because I may say at once this entirely differs from our account of the quantity of coals consumed. [Document produced].

Mr. CLERK: This is for the year, from the 1st of January.

Witness: If you take out the quantities from March 31, 1866, to April 1, 1867, you will have the quantities stated by me. I will call them out if you like.

Mr. LLOYD: If you will give us your result now, we need not waste time in going through them. Of course, if we find it properly verified and confirmed, there will be no difficulty about it. (To witness:) These are all Newcastle coals?

Witness: And inland. I am giving the two together; 2240 tons was the quantity used during the year. The quantity bought during the year was 2272 tons. I get at the quantity used in this way:—In the first place there were 50 tons in stock; we then purchased 2272 tons during the year, and gave away 35 tons at least, that is with the supply to Mr. Church's house and to his friends. The stock on the 1st of April, 1867, was 47 tons. If you put these quantities together, that will give you the quantity used.

By Mr. DAVISON: The price paid was 14s. 4d. per ton delivered on the works. That amounts to £1605 6s. 8d. The next item is "wages." I believe the wages book was destroyed, but I have the amount paid for stokers, &c., it was £393 9s. 11d.

By the UMPIRE: I kept the wages book and paid the wages.

By Mr. DAVISON: Repairing and refixing meters for the year cost £81 12s.; repairing and repainting public lamps, £23 16s. 1d. There was an oven rebuilt that year, with seven retorts, which cost £41 3s. 6d.; repairing the works, apparatus, and tools, and painting the iron work, cost £82 19s. 7d. Rates and taxes during the year were £92 12s.; stationery, about £10. The bad debts were in Mr. Burdon's account. Bad debts, and losses through the default of a collector, did not amount to 1 per cent. in the eight years. The collector ran away with £24 3s. 4d. which he had collected. One-half per cent. would be quite sufficient for bad debts. We should want money for working expenses. Mr. Spice reckons £900, which, at 5 per cent. interest, makes a total expenditure of £2409 3s. 1d. The result is a net profit of £3340 9s.

Cross-examined by Mr. LLOYD: I first went into Mr. Church's employ in April, 1862. I was then 17 years of age. I went as book-keeper. I had charge of the rental book, the wages book, the petty cash book, and the service-laying book; there was also a meter-charges book, and an account of the expenditure which had to be paid by Mr. Burdon for mains and new services laid. There was no cash book; but a bill book. I had charge of the bankers pass book. I last saw that book a few days ago. I think it is at the bank at the present time. In reference to the expenditure I rely upon the invoice book, the bill book, and the bankers pass book. I can give no information as to the amount of purchases for any year preceding the one I have given. I kept accounts, but have not preserved them. They were sent in a box to the works to be destroyed. There were also invoices and counterfoils of cheques, as well as the wages and petty cash books. They were burnt under the furnace. I saw the invoices thrown on to the fire. That was on the 29th of June, between half-past two and half-past three. There were present Mr. Penny, Mr. Thomas, Mr. Stone, Mr. Spice, Mr. Church, and myself. I was there the whole time, but I did not stand with my face to the fire the whole time, and therefore did not see them all destroyed. The burning took place at my suggestion. Each book by itself would not take up a very large space, but the accumulations of seven or ten years would occupy a good deal of space. I never weighed them, and cannot give the weight. My own salary was not entered in the wages book. My salary was two guineas a week. I received nothing beyond that, nor any promise of anything. Up to the 30th of June, when I left Mr. Church, I received nothing beyond my salary. Since then I have received nothing in the shape of money. I have received a gold watch, if you particularly wish to know. I was present at the arbitration, but was not called upon to give evidence before Mr. Barlow, the arbitrator. Mr. Paddon and Mr. Spice were the valuers.

Mr. LLOYD: If I am not wrong, Mr. Barlow took their valuation before he could make his award.

Cross-examination continued: The original books were actually referred to at that time. I was examined before the valuers, and gave them all the particulars. The whole of the books were not asked for, only the wages book and the account of the expenditure, belonging to Mr. Burdon.

Mr. LLOYD: A certain proportion of the expenditure belonged to Mr. Burdon, but he takes upon himself the whole of the charges, and therefore, so far as he is concerned, he is not bound to keep an account.

Mr. BARLOW: Except this, that there were sums which had to be paid for extensions.

Mr. LLOYD: It would not be an expenditure in the ordinary way charged against revenue. (To witness:) What other persons were employed upon the premises in addition to the stokers you mentioned?

Witness: There were men employed repairing meters and doing gas-fittings in the town. The time they were employed doing anything in the gas-works is down in the wages book. I made an analysis of the wages book every quarter. If a man was employed for a week, and during that time was engaged in doing work for which we were paid in the town, I deducted that and put the remainder to the works. Every man kept an account of the time he was employed, and I took that weekly. The time-sheets have been burnt. A portion of the time there was another clerk, when I was away. He was paid separate wages. I was out of Mr. Church's employ from November, 1865, to December, 1866, and another clerk was in my place; but I kept the books the same. I did them in the evening.

By Mr. BARLOW: I kept the account of the station-meter, and had the whole of the books under my control.

Cross-examination resumed: I did it gratuitously—"for the love of the Church." I felt an interest in the works. I did not feel it any hardship—it was pastime. The clerk who was there did not do his work, and I went to do it for him. One oven and seven retorts were put up that year, costing £41 3s. 6d. That would be the average cost per year. We were in the habit of putting up one stack of 7 retorts per year; sometimes two stacks of 5 retorts each. Out of 35 retorts we every year reset either 10, 7, or 5. I adhere to the statement as to the cost. In the first place, there were 7 retorts, and the cost, delivered at the works, was 3 guineas each. They were 9 feet long, at about 7s. per foot in round numbers. There was the labour taking down the old retorts and the dip-pipe in connexion with them. It took several men a few hours each, which made a week in all. For setting up I have £3 15s. 6d. for labour. There is also the cost of bricks and other materials used, and new furnace-bars and doors, which came to £14 1s., making in all £41 3s. 6d. I cannot say the cost of retorts as distinguished from the oven. It was all taken down, and rebuilt with fire-bricks. I do not include the arch, but simply what comes inside the arch. The item of repairing the furnaces comes under the head of "general charges." There is an item of £82 for repairing, which includes sundry repairs to service-pipes and mains. I cannot give the details of that item. The item includes repairing a main, which Mr. Church is responsible for, not that which is charged to Mr. Burdon. If any old mains were taken up and new ones put down, Mr. Church paid for them. I cannot tell the number of miles of mains. The item also includes repairs of pipes, but not of meters, which is a separate item. Mr. Church was bound to paint the ironwork once a year, but no extra men were employed, and nothing is charged for the labour, but simply for materials. I do not know what per centage this £81 9s. 7d. is on the total length of piping. The retorts were repaired in the spring. There was a man employed in repairing meters, and his time and the material used were kept an account of. That account was destroyed, as also the account of repairing and painting the public lamps. I have an account of the price of the coal, and also of the freight. The price, free on board, taking the average of the year, was rather under 7s. We did not contract with Mr. Burdon to supply coal at a certain price. The freight would be about 7s. on the average of the year. The coals were taken to the works in barges, and unloaded by porters. The porterage was 10d. per ton. The barges were Mr. Church's.

Mr. LLOYD: How much of the 14s. 4d. was for the labour of lightering and unloading?

Witness: Perhaps I can give it to you in this way. The quantity of coal bought and the quantity received are very different things. With every cargo of coal you get an ingrain of coal of 5 per cent. over; so that if you bought 200 tons, you would get 210 tons into your store. You have the advantage of that in the freight and cost at the pit's mouth, and in all the expenses incurred. You pay for what you have, and make the account.

Mr. BARLOW: You bought 21 cwt. to the ton, and your estimate of 14s. 4d. is made on the basis of 20 cwt.

Witness: Yes, or it would be 15s. 6d.

By Mr. PENNY: The town dues are an extra 3d. Mr. Church lost the benefit of letting his lighters during the time they were unloading the coal. The hire of a lighter would be 7s. 6d. per day. A lighter can be loaded and unloaded in a day.

Mr. BARLOW: Does the £900 put down as working expenses include the value of the lighter?

Witness: That is a thing I have not been able to speak to.

By Mr. LLOYD: One-half the rates and taxes were paid by Mr. Church. This £93 12s. is that half.

Mr. LLOYD: No, it is the whole. Where did you get it from?

Witness: From vouchers, which I believe are in existence, but I have not got them. They are at Chichester. By mistake, they were omitted to be burnt.

Cross-examination continued: Of the 810 tons of coke sold, 736 tons were sold at 15s., 60 tons at 12s., and 32 tons at 12s. 6d., which are equal to 810 tons at 15s. I got at that from week to week. I took out from the cash and credit book the quantity of coke, breeze, tar, and lime sold at the works. The foreman on the works and myself entered them in the books. There was an account as to whom it was sold, but it was burnt. I got the breeze and tar from the same account. The £25 for lime was independent of what was used in the works. I am quite certain there was no coke in store at the beginning of the year. The tar, breeze, &c., was all taken by the Government works on the Knoll. They take it generally in the winter months. There was a less demand for it the next year. We measured the quantity in stock, and found about 1000 bushels. The tar was stored in the small gasholder-tank. That storeage had been going on for many years. The 12,171 gallons is an assumption. There were 2240 tons of coal used; and, taking it that the general quantity of tar obtained from a ton of coals is 9 gallons, we have 21,160 during the year, and, as we sold 7989, we have 12,171 gallons left. I know a little about the process of gas-making. I have an account of the money paid to Mr. Church by Mr. Burdon under the contract.

Mr. DAVISON objected to this evidence, as the original book was in Mr. Burdon's possession, and the point stood over till that gentleman's examination.

Cross-examination resumed: I kept an account of the charges relating to Mr. Burdon himself, with reference to the extensions of which he was to bear a portion of the expenses. Mr. Burdon was to provide additional gas-meters, and was to be allowed 6 per cent. on the cost of providing and fixing them. There was also 1 per cent. to be allowed on the yearly account of collection. The accounts according to this contract were presented periodically, showing what was due from or to him.

Re-examined by Mr. DAVISON: I have been in Weymouth the greater part of my life. I am no relation to Mr. Church. I did not know him till he came here to carry on the works. Since I left him I have been taken into Elliott and Co.'s bank. It was in that bank I saw Mr. Church's pass-book; I made it up a few days ago. I had the materials for this account in the various books without this pass-book, which was only the check to prove that what was done was correct. On the 29th of June, when Mr. Barlow's award was made, and everything was at an end, Mr. Church was handed out of the works, and everything handed over to the new company; and on that day, at my suggestion, the books, with the exception of the pass-book, were burnt. I am sure Mr. Penny was present. I have never seen those books or papers since.

By the UMPIRE: There were three large boxes of books and papers belonging to different gas-works, besides Weymouth, which Mr. Church had had to do with.

Re-examination continued: The quantity of gas from a ton of coal may average 9000 feet, or a little over; 9500 feet have been obtained. The lime was burnt with the ashes and refuse from the works, which would not have been very profitable to sell.

Mr. PENNY: How was it that the particular book which you have there was saved from burning when all the rest were destroyed?

Witness: This book contained all the information. I got it out for Mr. Paddon and Mr. Spice, and it has been preserved, so that I might have it to refer to on any future occasion. I arrived at the quantity of gas consumed in the public lamps by a calculation of the quantity burnt by every lamp, so many dark hours and so many light ones, at 5 feet per hour. During the time I was away I took the figures for my statements from the wages-book. I can tell the pressure of the gas from eight o'clock, to ten or eleven. It was taken at the town office. I got it by reading the pressure-gauge. It was 17/10ths or 18/10ths. I do not know what it was at twelve o'clock. We had a self-registering pressure-gauge, but it was not used. It was the spirit-gauge which I examined, and I have the papers in which the results are recorded. Mr. Church read them as well as myself.

W. W. Burdon, Esq., examined by Mr. DAVISON.

I became member for Weymouth in 1830. I had been there previously, in 1825, as a visitor. I resided then in Newcastle. I have considerable property and collieries in that neighbourhood. I was induced by what

I saw in Weymouth to endeavour to commence gas-works, and did do so in 1835, I think. I desired to have the gas-works on this side of the back-water, but the Weymouth authorities objected to that, and desired them to be placed somewhere about where they are now. I applied for a bridge, and they said they intended to make a large dock, and would not consent, but they gave me permission to make a tunnel, which was executed. I represented Weymouth in Parliament for one session—I think till 1836. I continued these works, by my agents, in my own hands, down to 1856, and found the money, visiting the gas-works from time to time, and supplying them from my own collieries with coal. They were certainly not remunerating me up to that time. The town was in a very dull state, owing to there being no railway, so that it was partially cut off from the rest of the kingdom. The works did not pay me. I had to find considerable sums of money every year to carry them on, but I hoped the time would come when they would pay me. If I had sold them, I must have done so at a considerable sacrifice. In 1856 I gave notice and introduced a bill into Parliament. Under that Act there was nothing done—no contract, no purchase—but certain gentlemen who were my friends were appointed directors, and I traded under the title of the Weymouth Gas Company. They were kept as my own works, and carried on under colour of the Act; it was not much protection. I found the money. I acquired a copyhold property in the site at the time I commenced the works. I forget the name of the gentleman from whom I purchased it. I took some of the slob land—or land upon which the water flowed—and walled it up, and took a lease from the corporation of Weymouth. To the best of my belief that lease was dated 1838, but it was sent to my attorney, and I never saw it.

Mr. DAVISON read the recital of the lease, and a long discussion ensued as to certain erasures, which did not appear exactly the same in the copy as in the original, at the close of which

The UMPIRE said, as the matter stood, it appeared that two deeds had been engrossed, and that before they were executed or exchanged an inaccuracy was discovered, which was corrrected in one deed in the body and on the back, but in the other only on the back.

Examination resumed: In 1860 I found myself not making a fair profit, and I let the works under contract to Mr. Church.

Mr. DAVISON: You had considerable annoyance from the complaint made to you of the way in which Mr. Church was serving the public in Weymouth—not an unusual thing—but I think it ended in your doing your best to get rid of Mr. Church. You filed a bill against him?

Witness: My anxiety from the beginning has been that the town should have a good supply of gas at a reasonable price. I found complaints of Mr. Church's management, and I was anxious to put an end to the contract. The matter was left to two valuers—Mr. Spice for Mr. Church, and Mr. Paddon for me—with Mr. Barlow for umpire.

Mr. LLOYD: Of course Mr. Barlow knows what his award was. Perhaps you had better put it in.

Examination resumed: The articles valued to me by Mr. Paddon and Mr. Spice were handed over to the new company. They amounted to about £2177, but I cannot say exactly how much.

The UMPIRE: How came the contract to be terminated?

Mr. DAVISON: The terms upon which it was to be terminated were left to Mr. Barlow.

Mr. BARLOW: There was an arrangement come to between Mr. Burdon and Mr. Church for terminating the lease, and I was merely to assess the sum due to Mr. Church.

Mr. DAVISON (to witness): You filed a bill against Mr. Church, and there was an agreement to put an end to the contract. [Copy of bill handed in.] The value of the stock was to be settled by Mr. Barlow if Mr. Spice and Mr. Paddon could not agree. The award was made on the 29th of June, 1867, and the sum mentioned in it was £10,067 16s.

Mr. BARLOW: There is a further sum.

Mr. DAVISON: This is exclusive of £2642 due from Mr. Burdon to Mr. Church. I presume the valuation was distinct from that.

Mr. BARLOW: No; the valuation is included. The whole sum is £12,710 8s.

Mr. PENNY: That includes £10,067 for compensation, and £2642 for stock.

Examination resumed: I supplied the works with coal almost exclusively from the beginning. I have an account of the coal supplied to the works in the twelve months from March 31, 1866 to March 31, 1867. I had it made out at the colliery offices, from the commencement of Mr. Church's contract. The account produced is in the hand-writing of one of my people. The weights mentioned in the account would be the weights shipped and charged, not including that which we know is usual. My collector has the meter-rent account here. I have not every individual detail of expenditure, but I can give you pretty nearly the amount.

Cross-examined by Mr. LLOYD: Up to 1856 I had to find £500 or £600 a year to carry on the works. It was a bleeding artery always running.

Mr. LLOYD: If you had not had an interest in Weymouth, and had not found here a market for your coals, you would have discontinued them?

Witness: It was a market for coals.

Cross-examination continued: Previous to the time I entered into the contract with Mr. Church my manager was Mr. Lorkin. Mr. Dodson was manager for a short time, but I forget the exact date when. When I came to Weymouth occasionally I looked at the works, but I deputed them to a manager, and when he had anything to pay I received it, but unfortunately I seldom got anything. When Mr. Church took the works he superseded Mr. Lorkin. I had not any contract with the previous manager; he simply acted as agent. I saw clearly that it was better for the town and for myself to make the arrangements I did with Mr. Church. I thought the works would be better carried on. I stipulated for myself, among other things, to collect the rents by my own collector, he paying 1 per cent. for that collection upon the amount; and out of the rents so collected I was to pay over to him two-thirds, retaining one-third for myself, except as to the public lamps, for which I was to hand over 80 per cent. to him, retaining only 20 per cent. for myself. The public lamps here were a considerable loss, being charged the lowest price in all England, I believe. I have had accounts under this contract furnished by Mr. Church, and from my collector of the rents received. Knowing what I had received, I was enabled to make payment to his bankers of the stipulated amount, and did so. I have so many matters to attend to, that I cannot individually give you the account for some years past of the moneys so paid over. I have the accounts at home, but did not bring them up with me. The gentleman who audited the accounts (Mr. Brown, of Dorchester) sent me the exact account; and the net receipts from the consumers were divided into three, I retaining one-third, and paying two-thirds to Mr. Church. I do not know whether there is a personal entry at the bank in my name, but I think it was entered generally as "Gas account," and that two-thirds went to Mr. Church's account and one-third to mine; and I received, as the money accumulated, a cheque upon the bank. I can tell the net amount received, but I cannot give it now. There were certain charges which I was at, but I am afraid I have not an account of them. Very likely I did not like the amount I had to pay. I am afraid before I got any receipts there was a good deal paid down. We shall be able to furnish the amounts received from year to year in respect of these works from the time Mr. Church entered.

Mr. DAVISON: You will not furnish it in the way Mr. Lloyd wants it. These things were for extensions.

Mr. LLOYD: Under their proper heads.

Mr. DAVISON: To give an account of what he received from Mr. Church, less what he expended upon the works, is a thing you cannot expect him to do.

Mr. LLOYD: I want to know what he received from Mr. Church, what he retained for himself, and what net sums he has put by year by year; stating whether the payments were for extensions or anything else, because that is a question of capital and revenue. I do not mean to say what he put into his pocket net, because part of that may be on account of extensions, which would not be applicable to revenue.

Cross-examination continued: Mr. Paddon acted as valuer for me. He is not here now, nor is he acting for me. Mr. Spice was the valuer for Mr. Church, and since that time he has been acting for me. I do not recollect whether Mr. Church ever offered to go out on receiving £3000. I offered him £1000, but I did not expect him to accept it. We often make offers which we do not expect to be accepted. I have no recollection of a correspondence in 1848, when the discrepancy in the lease was discovered. It may be just possible, but I cannot say.

Mr. DAVISON: This is rather too much. I had occasion to remark yesterday upon the mayor—who happens to be a solicitor for the gas company—producing this document in this way.

Mr. LLOYD (to witness): You do not remember anything of the correspondence.

Witness: It is possible there may have been a correspondence. [Letter handed to witness.]

Mr. LLOYD: I do not mean to state that Mr. Burdon would say what is inaccurate, but of course his memory may fail him.

Witness: That is my writing—I have no recollection of it—but it is my writing.

Mr. LLOYD: I believe accounts were furnished to you under this contract. According to the 11th clause, Mr. Church was to keep a proper account of all expenditure connected with the repairs—both works, buildings, &c.—and supply the same to you when required. Was that done?

Witness: I dare say it was done to a certain extent. I cannot precisely say it was done to the full extent. Probably it was. I cannot say that I have the accounts of repairs to the works. I am obliged to weed out many accounts from time to time, and I am afraid that many of these have been destroyed.

Mr. LLOYD: I see you had to pay one-half of the rates and taxes. Have you an account of those rates and taxes?

Witness: If there is an account it will be with the auditor.

Mr. LLOYD: Will he be here?

Mr. DAVISON: Do not pledge yourself to anything, Mr. Burdon, unless you want to conduct your own case.

Mr. LLOYD: I do not know whether the taxes are things settled by the auditor. I see you are to pay one-half [reading 11th clause] other than and except the income and property tax. I suppose, therefore, there was such an account of your proportion of those rates and taxes?

Witness: Yes. No doubt I paid those taxes accordingly. I cannot tell you off-hand whether I paid upon the whole profits or upon that portion which went into my own pocket.

Mr. LLOYD: As I read it, the whole income or property tax was to be paid by you, not only upon your share, but upon the two-thirds belonging to Mr. Church. Do you read it so?

Witness: I cannot tell that. I dare say I have the accounts of last year by me, if not those of earlier date.

Cross-examination continued: The works have been valued. The parties who valued them know what they valued them at. I do not know. I have had estimates submitted to me of what, by possibility, the thing might be worth; but any actual *bonâ fide* value I do not know anything about. The only valuations I know to have been made are for the present occasion. No doubt, part of the value is capital, but I cannot tell how much. I have not put any value on the lease and works for the purpose of ascertaining the rental which ought to go against the receipts.

Mr. LLOYD: You know, when a man has works upon his land, they must be put at some rent or other.

Witness: I do not know that there has been any special rent.

Mr. DAVISON: Surely this is not a question for Mr. Burdon, who knows nothing about it, when my friend can have any number of gentlemen who know all about it.

Re-examined by Mr. DAVISON: The main part of the expense I had been at since Mr. Church went there was for extensions and renewals.

Mr. DAVISON: Can you say whether you spent hundreds or thousands there? My friend abstains from asking you the total value.

Mr. LLOYD: I expect the accounts to be produced, to show what was expended in that way.

Witness: Since Mr. Church went there, I have laid out hard upon £11,000.

Mr. DAVISON: But cannot you produce an account, or get it made anywhere from anything in your possession, to show upon what that expenditure has taken place?

Witness: I put down many of the items and things upon which the money has been expended, but the actual bills I am afraid will not be forthcoming.

Mr. LLOYD: Mr. Church keeps an account; he is bound to do it.

Re-examination continued: I have certainly not given Mr. Spice minute particulars. Supposing I had bought retorts, or 50 yards of pipes, I have not the information for those particular things. Mr. Church may know.

Mr. DAVISON: My learned friend asked you about the time up to 1856, when you were losing something. Has it been a good paying thing for the last few years?

Witness: It has been paying something; but, under the circumstances, I am forced to give them up just at the time when they are beginning to pay well.

Mr. LLOYD: Have you not publicly stated, printed it, and made it known, that you were prepared to reduce the price of gas to 4s. 6d.?

Witness: I offered to supply the town at 4s., but they considered it better to go to Parliament for power to supply themselves at 4s. 6d.

Re-examination resumed: That was at the time they were threatening me with a new company. They went to Parliament, and I had to follow them to oppose them.

Mr. DAVISON: But the concern was so good at the time that rather than

have another company to take the business away from you, you said you would reduce the price to 4s. 6d., and ultimately to 4s.?

Witness: Yes. Capital which had not paid hitherto was just beginning to pay. I withdrew the notice to supply the town at reduced prices, and the Act received the Royal Assent.

Mr. *Thos. Crocker*, examined by Mr. CLERK.

I am clerk to Mr. Howard, who is the Weymouth solicitor of Mr. Burdon. I kept the books of the meter-rental in the town, and collected those rents on the authority of Mr. Howard. I have the book with me [producing the same]. The accounts are for different quarters. For the quarter from March to June, 1866, the rents were £707 3s. 7d.; in the September quarter, £904 11s. 6d.; December, £1622 18s. 10d.; March, 1867, £1596 18s. 2d. The total is £4832 12s. 1d. That includes meter-rental and also the public lamps.

Cross-examined by Mr. LLOYD: This book has not been produced to Mr. Tizzard. I do not think it has been asked for. The rent is calculated upon 5s. 6d. per 1000 feet. There has been no change in my recollection. I am not paid for the collection; I am simply engaged by Mr. Howard upon a certain salary. That is not the whole business I do, but it takes up a good deal of my time. I have also to look after the Portland Local Board, and various other things. The collecting would take me a month out of the quarter to do it properly. I think Mr. Howard receives 3 per cent. from Mr. Church and 1 per cent. from Mr. Burdon for the collection. There are a few bad debts; some people go away, and leave houses empty. I do not think they carry out the system of cutting off the gas now. There have been no suits in the county courts in my recollection. We may have had to compromise a few shillings. I do not recollect a criminal prosecution against any consumer. I have been collector of the gas-rents for six months; previous to that I collected with Mr. Gough.

Mr. HOWARD: Mr. Gough was a clerk in my employ, but left from ill health, and then this clerk was put on.

Cross-examination resumed: I cannot speak with any certainty as to whether there have been many disputed claims—old ones. I have not looked into matters sufficiently.

The UMPIRE: But you would hear of them when you went to collect.

Witness: There was a grumbling on account of the prejudice existing.

Re-examined by Mr. CLERK: In the cases where we compromised, perhaps in one part of a quarter a meter would register, and not in another, and the amount of consumption was computed. There were no other cases that I am aware of.

By the UMPIRE: I have taken out the quantities for the previous year from the books. [Return handed to umpire.]

Mr. LLOYD: I just want to call attention to this point before the book goes. There is a heading of "Deductions" here, but nothing put down under it. (To witness:) These are the amounts charged, and not the amounts paid.

Witness: No. I cannot tell what has been received for the twelve months. The same thing applies to the other entries for the previous year. All the entries here are the amounts charged. The cash-book is at the office, but that will not show the amount actually received, because the last quarter has not been audited. It would show the proportion of receipts to charges for all previous years. That book has been audited by Mr. Brown up to Christmas last.

R. P. Spice, Esq., examined by Mr. CLERK.

I am a gas engineer, and for a great many years have had considerable experience both in the management of gas-works and in the valuation of undertakings similar to the present. Somewhere between January and March I first came down here with regard to the gas-works. At that time an agreement had been entered into between Mr. Burdon and Mr. Church for the surrender of Mr. Church's interest in these works. I acted on the part of Mr. Church, while Mr. Paddon acted on behalf of Mr. Burdon. I had the whole accounts of the office laid before me. When I went into Mr. Church's office, I said, "My business is to prove what has been the cost price of gas, and what have been your profits from the sale of gas; and, in addition, your extraneous profits, or casual profits from the working. Whatever your income from that has been I must have in detail, that I may prove your case." That request of mine rather frightened Mr. Church and his assistant, Mr. Waters, because they had not been in the habit of keeping such accounts as would show me precisely what I wanted. When I was told they had not got what I wanted, I said, "I must see what you have got," knowing full well, as a valuer, I should not be believed if I said I was told by Mr. Church and Mr. Waters what was the state of things, and not what I had actually seen myself. The analysis produced by Mr. Waters is the result of an examination of the works at that time. I first of all had to satisfy myself, and then satisfy Mr. Paddon, who opposed me. We both had those books before us. I followed Mr. Waters when he was giving his evidence with my own papers before me, and checked them off, and he gave a correct statement of what I found by myself and Mr. Paddon—viz, the expense of the manufacture of gas, the cost of carrying on the concern, the cost of coals, wages, and tradesmen's bills.

Mr. BARLOW: Income and expenditure?

Witness: Yes.

Examination resumed: Mr. Paddon and myself were mutually satisfied of the value by the books.

Mr. CLERK: Was any offer ever made to you, on behalf of Mr. Church, as a sum to be paid for the surrender of the works?

Witness: No; I heard of an offer which Mr. Church had made, and thought him a great fool for making it.

Mr. CLERK: Now we hear from the award there was a sum of £10,000 awarded to him.

Examination continued: There were several items or sections in that award which were not the subject of agreement. In the inventory there were comprised a great number of articles which were handed over to the new company, and for which Mr. Penny, the engineer to the company, signed a receipt

Mr. PENNY: If you will forgive me for interrupting you, I would say that I signed that receipt taking the matter just as it was put before me, Mr. Spice pledging himself that if anything was not there it should be made good. I did not pledge myself or the company to any valuation or to anything else. I signed the receipt, Mr. Spice pledging himself that if anything was not there it should be made good.

Witness: I think that is the substance of the understanding, but I should put it rather in this way: I said to Mr. Penny, "If you will take my word and sign this receipt," which I read to him, "I will put you in possession at once, but if you do not I must decline to put you, as the agent of the new company, in possession of the works till we again meet and go through the schedule." He took it that the things were there—that it was a correct schedule. It was understood that it was correct, therefore Mr. Penny signed it; it had nothing to do with the valuation. I think I am right.

Mr. PENNY: Yes.

Examination resumed: To the best of my belief everything in that schedule was upon the works at the time, or in the office in the town. I had gone into the valuation of those things item by item. I have no hesitation in saying the proper value was put upon them. They represented the amount of £2177 0s. 5d. With regard to the quantity of gas made, we had the station-meter book before us, and took it to be a correct account. We were told it had been kept in proper order. The quantity of coals we had from the invoices. We found the quantity received was less than the quantity admitted to be used, and the difference we ascertained to be what was in stock at the beginning of the year, and what had been brought from other sources. I have seen the account of the shipment of coal during the year 1866-7. From that account I find there was received from Mr. Burdon 1899 tons 8 cwt. If we add an ingrain to that of 5 per cent., 94 tons 19 cwt., it is equal to 1994 tons 7 cwt. Then there was the purchase of inland coal, 277 tons 18 cwt. This is a repetition of the figures in the invoices, and it gives a total of 2222 tons 5 cwt. Then, in March, 1867, received 2242 tons, as stated in the account; coals sold and used, 35 tons, by Mr. Church, gives a total of 2275 tons, leaving 47 tons in stock on the 1st of April, 1867.

Mr. LLOYD: May we take this ingrain of 5 per cent. as a fact?

Mr. DAVISON: Mr. Burdon has proved it. There is no question about it. They all give 21 cwt. to the ton.

Mr. PENNY: I may say it is not a fact.

Mr. DAVISON: I shall have much pleasure, sir, in examining you when the time comes; but I venture to think that it is not proper for you to make a statement of that kind, because—forgive me for saying it—you are not here as an ordinary arbitrator, but are the engineer to the company. I hope that you will understand that I am speaking with the greatest possible respect to you, in the interest of my client.

Witness: It was a contract between Mr. Burdon and Mr. Church, and these quantities exactly agreed with the quantity used and in hand and what had been supplied to Mr. Church's house. You will remember that, acting for Mr. Church, I had no interest in making that allowance of 5 per cent., but I did it on his assurance that he had the 5 per cent.

Mr. CLERK: Having got that as a matter of fact, does the quantity of gas which is said to have been made represent, according to the ordinary process of manufacture, the probable quantity of gas made?

Mr. LLOYD: We have had it before; it is about 9000 cubic feet.

Witness: It is a fair average under the circumstances of using clay retorts with no exhauster.

The UMPIRE: In these works, and with the quantity of coals?

Witness: 2240 tons, multiplied by 9000 cubic feet, you see, represents the quantity shown by the station-meter.

Mr. CLERK: Now, then, with regard to other products, the coke said to have been sold during the year, does that represent fairly the amount of coke which would be produced from the quantity of coal supplied?

Examination resumed: I do not think any one would quarrel with the quantity of coke said to have been produced. I had the means of verifying the accounts with reference to the quantity sold. I took it from the books, which showed that so much money had been received for coke, regularly entered, months before the arbitration. £785 5s. 7d. was the money received for coke, breeze, and tar, and only £131 14s. 5d. was the balance of that which was unsold. We put that which was unsold at a much lower valuation; tar, for instance, was put down at 1½d. instead of 3d. at which it had been actually sold. I put it down at 2d., but when we came to the quantity remaining, I could not extract from Mr. Paddon more than 1½d.

Mr. BARLOW: Does not 1½d. apply to the large quantity in stock?

Witness: I have only applied it to the small quantity of 12,000 gallons, which was the residue of the year's make.

Examination resumed: The amount of gas and meter-rental was an agreed sum between Mr. Burdon and Mr. Church. It was £4032 12s. 1d. In that item I have added the price of coke, tar, breeze, and lime, £917; making a total of gross receipts £5749 12s. 1d. On the other side, Mr. Waters did not include anything for the salary of a manager, but I do; I put it down at what I understood the present manager's salary to be, £150.

By Mr. LLOYD: Mr. Church was his own manager, and therefore did not want a salary. If there should be an increase in the consumption in the future, there would be an increased salary to pay for management; but at present I think £150 is a fair start.

By Mr. CLERK: There is another item not included by Mr. Waters—"Collectors"—and I put that down at 2 per cent., which I consider is a fair rate. I have put down £96 12s. 6d., which is 2 per cent. upon the amount collected. You will find the charges range from 1½ to 2½ per cent. A concern like this should be done at 2 per cent. Of course, you would not expect Mr. Howard to do the collecting. He is Mr. Burdon's agent. Mr. Waters did not include "Tenant's capital"—four months expenses, which were at the rate of about £800, and I put them down at £900.

By Mr. LLOYD: That is the interest for working capital. I have put it down rather in excess of what we usually allow, and the reason is that you must go on making gas for three months before you make out your bills, and then there is another month before you begin to receive any money, and you must have sufficient capital at the bankers to meet your expenses. I have debited the concern with 6 per cent. upon £900, which is £54.

By Mr. CLERK: I have not cast up the total expenses. I have them separately. The profits are £3093 15s. 5s. If you deduct that from the receipts you will have the expenses.

Mr. CLERK: Before we leave that point there is one matter to which I must call your attention, which was elicited to-day, namely, that the price of coal was taken at 14s. 4d., but that Mr. Church did the lighterage with his own lighters, and that there was no charge in the accounts for lighterage.

Witness: No; but the expense of those lighters was included in the general trade charges, therefore there is nothing to add. If you add 3d. to the cost of the coals, as Mr. Waters did, you must take 3d. per ton on 2240 tons for trade charges, so that it is as broad as it is long, because lighters were mentioned in the trade charges.

Mr. LLOYD: I should like to see it. It is quite clear that it cannot come in under any head of expense that we have.

Witness: No, sir; it is in trade charges, maintenance of works, and tradesmen's bills.

Mr. LLOYD: We have no tradesmen's charges further than repairs.

Mr. CLERK: You have taken the price of coal at 14s. 4d. per ton, which gives the same result as Mr. Waters, £1605 8s. Then wages are the same, £393 1s. 11d. Does that item of £393 1s. 11d. include any wages for men doing work upon the barges?

Witness: It is not in that item.

Mr. CLERK: Now, the next item is £229 11s. 2d.

Witness: Yes; I have those figures exactly. It was £239 19s. 9d., and I have taken £10 off that sum, for a specific reason, and put it on wages,

which were £383, making them £393. There was £10 misplaced, but as I had Mr. Paddon to satisfy, and I found it was misplaced, I altered it; it is not material to the account. Trade charges included, to the best of my recollection, all the expenses connected with those lighters. There might be something in wages for repairing them, but in the tradesmen's bills I distinctly recollect there were some charges connected with the lighters.

Mr. LLOYD: There is no item here.

Witness: But in the trade charges there were some tradesmen's bills about the lighters.

Mr. CLERK: Your £229 11s. 2d. is the sum of the trade charges given in by Mr. Waters for repairing and refixing meters, &c.; you mean the last item, I suppose.

Witness: Some of it, and some of it may be in the item of wages. I have £54 19s 3d. as actual wages in trade charges.

Mr. LLOYD: Does it come out in the aggregate the same?

Witness: I have not the aggregate before me; I have only my memorandum. I have an item for working the limestone, which is put in the account separately.

Mr. CLERK: You say it is £229 3s. 1d., plus manager's commission.

Mr. LLOYD: Do you adopt his figures?

Witness: Yes.

Mr. CLERK: As far as you believe, the additional cost the company would be at in the lightering of the coal is included in some of those items for trade charges?

Witness: Yes; that brings out the net profit for the year £3093 15s. 5d. In valuing the works for the purpose of sale I multiplied those profits by 16¾ years—being the usual way of proceeding in a concern like this—which gives £51,562 17s. That makes it 6 per cent. stock. That is an accepted rule, and I have never known a deviation from it in valuing the property of a private individual; but to a company I should have given 20 years purchase. That is a very general rule. I should think I had done a very clever stroke of business if I had got 20 years purchase for my client. I am valuing the gas-works, and that which they are capable of doing. If they were not capable of earning that money, there would have to be some deduction; but they are capable of doing more. There is something set down for a new engine, exhauster, and building complete, and I valued those to Mr. Burdon at the price at which they were put up. They had not been worked, but they were put up with a view of making and producing a considerable profit. If Mr. Church had had that exhauster the last twelve months he would have saved something like 10 per cent. of coal, and wages and trade charges would have been reduced in proportion; but, as it had done nothing, I thought it only fair it should be paid for at the cost price, which was £491. The next item is the stock in trade, which represents a value of £2177. The next item is £150, which I think the gas-fitting business is worth. I take it at three years. It is quite apart from gas manufacture. There was a gas-fitting business carried on by Mr. Church.

Mr. LLOYD: We do not purchase that.

Witness: You elect to buy the fittings.

Mr. CLERK: You buy our undertaking.

Mr. LLOYD: We cannot do gas-fittings by our Act of Parliament.

Mr. CLERK: That is what we are selling, the gas-fitting business.

Mr. LLOYD: Not to us; we cannot prevent you doing it at all.

Mr. CLERK (to witness): At the same time, for the present purpose, you take it and put it down at three years purchase?

Witness: I have; I thought of the possibility of the company carrying on the business.

Examination continued: The land I have put down at £750; that is taking it at £1000 an acre. This gives a total of £55,130 17s. From that I have deducted £600 for the renewal of two old gasholders, and sundry repairs. With regard to the capacity of the works, the present consumption would not require their full power. It might be increased from 30 to 40 per cent. When the works were handed over there were 33 or 35 retorts, producing on an average 4000 feet each, or 140,000 feet in 24 hours. I heard this morning from the manager that the present production was 100,000 feet per day; but I have seen nothing actually since the last day in June. About Christmas last the average production was 90,000 feet per day. In the increased capacity of the works I include 10 per cent. upon the present power for the extra production due to the exhauster. As to the prospect of increase in the consumption, I have no doubt that in three years from the 31st of March in this year the increase will be at least 40 per cent., unless something very adverse occurs in the character of the town. The present works would be capable of meeting that. I have taken the price at which the gas was sold in the year under review. It may seem paradoxical, but I think the net return will be almost as good at 4s. 6d. as at 5s. 6d., taking the increased consumption into account.

The UMPIRE: Not quite so well.

Witness: Yes. I am not joking.

The UMPIRE: I am not joking; I am putting it gravely.

Witness: I do not mean to say anything foolish or absurd, but I do say that it will be so, from the circumstances that I find gas is being manufactured here cheaper than in very many places with which I am acquainted. Labour is cheap; coals are got in at a low price; all the facts are such as to justify my belief that the new company, assuming they manage their works properly, which I have no reason to doubt they will do, may make as much gross profit upon a 4s. 6d. price as Mr. Burdon did upon 5s. 6d., because the increased consumption will make up for the reduction of price.

Mr. LLOYD: Not if they have to give large compensation.

Witness: I have no objection to guarantee it if they would make it worth my while. There is nothing to be afraid of.

Examination resumed: Supposing everything remains as it is, there would be a difference of £750 between the 4s. 6d. and 5s. 6d. upon the present quantity sold. I think the public lamps at present are a loss. They will be worth £500 more when the contract expires, the Act stating that they shall not be charged more than the lowest price charged to any private consumer. I have extracted from the books an account of the extensions of mains and services, from June, 1864, to June, 1867. The amount was £699 19s. 11d. To induce Mr. Paddon to agree with me, I deducted from that amount 15 per cent. discount, because there was a great doubt as to Mr. Burdon being liable to pay more under one of the clauses in the lease, Mr. Church having spent more money than he was authorized to do year by year. The next item is for meters purchased and fixed—£116 15s 9d.—by Mr. Church, and paid for by Mr. Burdon at the end of the time. That item is for the same period—3½ years. I do not understand that I am asked anything about repairs; I am picking out these items under the head "Extensions."

Cross-examined by Mr. LLOYD: In addition to the extensions named there is a purifier and sieves, £87 17s. 6d. This was an enlargement of a smaller one. The new ones were four or five times the size of the old ones. There is no renewal or depreciation fund. The renewals are charged against revenue year by year. The annual charge of £229 for renewals includes repairing and fixing meters, and also lighterage and repairs of barges, which would be about £25 per annum. I went through the books for the purpose of ascertaining these trade charges. The charge of £41 for resetting retorts and rebuilding ovens is not so much out of the way, when it is considered there was an ascension-pipe and hydraulic main already there, and that only the doors were required. The new exhauster was finished three or four days before the 29th of June, but never brought into use. The contract was entered into the year before. The expenditure of £419 for that exhauster would give more than 10 per cent. upon the present production. If the profits were £1500, 10 per cent. added would make £1650, but that does not apply to everything. There are fixed charges which could not be reduced; the wages might be less.

Mr. LLOYD: I want to know generally what would be the diminution of expense?

Witness: Gasmen's opinions differ. Some men would say an exhauster improved the production to the extent of from 7 to 10 per cent.

Mr. LLOYD: You have had experience in gas-works. Supposing a price of 5s. 6d., for example, to raise this sum of £4000 odd in rental, what would be the proportion generally—what would the reduction make?

Witness: It is difficult to generalize; but I may say I found the charge of production lower here than I usually found it.

Mr. LLOYD: What have you usually found it?

Witness: Taking the balance-sheets of companies, which are public property, you will find their returns are a little more than one-third of their rental. I myself have given one-half to a company.

Mr. BARLOW: You mean the profits?

Witness: Yes; if you take the balance-sheets of companies generally you will find the profits come to from one-third to a little above one-half of the gas-rental. I myself have had works in which I gave one-half the amount of the rental to the company for them.

Cross-examination continued: I have had experience in the rating of gas-works. In order to get at the gas-rents, in such a case as that, I should take the actual expenses of the company, and prove the case from the company's books. There would be a depreciation-fund of 1 per cent. The length of time a retort lives depends upon the way in which it is handled. Some people are of opinion that there is greater economy in renewing at the end of three years than at four. Some will make them go on for five years. The rule as to clay retorts is three to four years. I have had clay retorts in use five years myself. If I were engaged on the part of a gas company to ascertain the net rental at which the assessment should be made, I should make a deduction of 1 per cent. upon the destructible portion for depreciation. The land would last for ever, and the buildings would last three-quarters of a century. We take the life of a gasholder at, say, thirty years, and then we take the life of the mains. I find that 1 per cent. upon the value of the destructible portion is about right. The salary of £150 for a manager, in the case of the Weymouth works, agrees with my experience. Mr. Church has been receiving about £3232, and then he had to be at all the charges of making the gas, which expenses amounted to £2500, leaving about £1600 or £1700 at the least. When Mr. Church and Mr. Burdon were about to settle, Mr. Church would at one time, from the state he was brought into—almost into his grave—have taken the sum of £3000. I do not know what that sum included. There was to be a valuation of the rental, but whether a valuation of his loose stock I have never heard from him. The works were in such good condition when they were given up to Mr. Burdon that there was nothing to pay for dilapidations; but, in handing them over to the company, I have allowed £600 to put anything right that was wrong. I saw some of the pipes at the town-hall; that is a state of things you may expect to find in a seaport town. Where there is sea water in the soil, they do not last long. The proportion of leakage—9 per cent.—I consider small. I have known it smaller. The leakage, as a rule, is in the service-pipes. If the service-pipes are bad and out of order the leakage is always greater. I am not surprised that the leakage appears so small, when I know the fact that within the last four or five years nearly half the mains have been relaid. Relaying does not mean new mains. I believe the leakage was something like 40 per cent. when Mr. Church came. I have taken to works myself where the leakage was between 40 and 50 per cent.

By Mr. BARLOW: I reduced that below 10 per cent.

Cross-examination resumed: Leakage depends very much upon how the mains are laid. It is a scientific fact that gas finds its way through pipes into the surrounding ground, but practically it is worth nothing. There is nothing to occasion smell or loss worth notice by the working of gas through the metal. I have not gone into the valuation of the works themselves; I took the calculation of 16¾ years as the most correct way. It is a general rule, which I have known for years. I have never known it done any other way.

By the UMPIRE: I do not remember a transfer or sale under similar circumstances to these. The last case I was concerned in was at Southampton; that was by agreement, and the valuation of the business there was the basis of the transaction, the question being what the works were equal to.

Cross-examination resumed: The Surrey Consumers Company bought the business of the Deptford Company upon the commercial value. That was 10 or 12 years ago. I cannot call to mind any other case. I have not been concerned for any water-works. My object here was simply to ascertain what Mr. Burdon should pay Mr. Church. We had to ascertain the actual fact as to what the cost price of gas was, and then the value of the stock. It took some time to do it; we were engaged upon it, more or less, for a fortnight. We then reported to Mr. Barlow that we had agreed as to the question of valuation, and left to him an adjustment of the balance of account between Mr. Church and Mr. Burdon. I have nothing to do with the capital of the new company; I was not consulted at all. In the Surrey Consumers case the larger company absorbed the less, and in that case the works would be comparatively useless to them, because they were making gas at their own central works.

Mr. LLOYD asked the arbitrators to view the pipes spoken about before they went away, upon which

Mr. DAVISON said if the thing had been done properly notice should have been given to the other side to send some one to see them taken up.

Mr. LLOYD said wherever they came from they might be seen, and some idea formed as to their state.

Re-examined by Mr. CLERK: I remember a case, in which I was not immediately concerned—at Lowestoft—in which the works were sold by an individual to a company, and I think the rate at which they were sold was something like 20 years purchase.

Mr. LLOYD: Be careful now; I was in that case, and know all about it.

Mr. CLERK: Have you been engaged in the sale of other works than gas-

works—commercial works—from individual to individual, a brewery for instance?

The UMPIRE: I do not think that would throw any light upon the subject. There is no analogy between the two. A brewery would be bought partly at its commercial value, but certainly on the value of the structure.

Mr. CLERK: Upon what it is capable of producing.

The UMPIRE: But still you would look at the structure.

Re-examination continued: I have never been engaged with regard to railways. As far as my experience and professional knowledge goes, the mode here adopted is the usual mode. The exhauster, which is part of the works now in the company's possession, is used by them. I do not know that it is of great benefit to them. It might be an injury.

The UMPIRE: What might be an injury?

Witness: If the exhauster is not properly worked it may be an impediment rather than a help. If properly worked it must be a benefit. They may prove that it is not doing any good.

Re-examination resumed: I saw a bundle of pipes at the town-hall this morning, and I supposed they had been taken up in the town. The duration of a pipe, in a town like Weymouth, would depend upon how it was prepared before being put into the ground—whether it had been heated and tarred. A naked pipe, as it comes from the manufactory, would not last more than five or six years. If properly prepared, it might last double that time. I do not think it is economical to let service-pipes go very long without taking them up, inspecting, and retarring them. If clay retorts last generally about three years—that is, if that is the proper life of a clay retort—there would be on an average a renewal of some 10 retorts in a year. Taking them at £6 per retort, that would give an average cost of £60, instead of the £41 2s. 6d. which appears in the accounts for 1866. That is the outside.

Mr. LLOYD: Does that include the rebuilding of the ovens?

Witness: There was some little confusion about that. I think the witness did not understand what I understand. The arches were not taken down, and, if not, the ovens could not be rebuilt. It must be simply the contents of the ovens. It may have been that the arch was replaced in the case under review, but £6 would not repay the cost of taking down an oven, pure and simple, and all its contents. There are not only the arches, but there are the walls upon which the arches rest; but I got out those figures—£40 odd—as the actual expense of replacing the retorts. What was done I do not know. As a gas-man, I should not say that £6 a retort would replace retorts and oven included.

By the UMPIRE: I should say £3 more would, or perhaps £2; but an oven will last many years.

Mr. LLOYD: I think I understood Mr. Church to say it was an internal, not an external wall.

Mr. BARLOW: By the oven Mr. Waters understood the arch which covers the oven, not the rising pipes and hydraulic main.

Mr. PENNY: We took it at that.

Re-examination resumed: I saw the works yesterday, and noticed the lid of a purifier in a very indifferent state, which much surprised me. That purifier was at work in June, but I must admit it is now very much decayed, and more than I should have thought, in June, it could have been.

Mr. PENNY: Do I understand you correctly to say that to your knowledge the leakage was 40 per cent. when Mr. Church took the works?

Witness: My knowledge was based upon a statement laid before me of the coals used and the gas made in the first year, and I have no reason to doubt it. Mr. Church went on increasing the rental without making more gas, which would be the natural effect of the leakage being reduced. It was in that way I received my impression that the things grew gradually into a better state.

Mr. PENNY: That would, without any reference to the goodness or badness of management, account for Mr. Burdon finding the works unproductive?

Witness: Yes; they were badly managed before.

The UMPIRE: I suppose that is an unusual thing, such a leakage as that?

Witness: It is an extravagant leakage; there are cases, however, like it in the country. I should say the general average in tolerably well managed works is about 15 per cent.; 10 per cent. is very good working. I have known, in one particular case, where the unaccounted-for gas amounted to only 6½ per cent. That was one of my own works, and it did not last for long, as some sewage works were executed in the town, which disturbed the ground very much, causing a sinking which displaced the mains, so that the leakage ran up to 15 per cent.

Mr. PENNY: Upon full consideration, do you think these 35 retorts would enable you to make 40 per cent. more gas, and that you could make or get 4000 feet per retort?

Witness: I can refer to two works in which 15-inch clay retorts, 9 feet long, are used, and the make is 4200 feet in one, and 4300 feet in the other.

Mr. BARLOW: Per diem?

Witness: Twenty-four hours, week after week. I can give the names of those works.

Mr. PENNY: You have carried on gas-works yourself, and are considered very capable. Is that the result of your experience?

Witness: Yes; with 15-inch clay retorts.

Mr. PENNY: I do not mean when quite new?

Witness: I have known 15-inch retorts, 9 feet by 5 feet, produce 4400 and 4500 feet. The town I now refer to is Boston, in Lincolnshire, and the manager is Mr. Stout. I had it from him himself. I can tell you that 4200 feet is being made at the present moment at the Hampton Wick Gas-Works, the property of the Hampton Company, and 4400 feet at the Reading works, the manager of which is Mr. Baker.

By Mr. PENNY: I should not like to have every retort at work, as there would be no margin. You would commence the winter with a weakness in the retorts, and would incur a loss in putting on new retorts.

Mr. PENNY: That is almost practically saying it could not be done.

Mr. BARLOW: Mr. Spice has made no claim in his estimate for any exhauster.

Mr. PENNY: He has stated the fact that it would tend to increase the value of the works.

Mr. BARLOW: But he has put down nothing on that score. (To witness:) Do you know anything of the condition under which the Birkenhead Gas and Water Works were sold?

Witness: Only by report.

Mr. PENNY: When you say each retort will produce a certain amount of gas, do you mean by working 6-hour charges, or shorter hours?

Witness: Six hours. The Reading Company are working both 6-hour charges and 4-hour charges in the 24 hours.

Thomas Hawksley, Esq., examined by Mr. DAVISON.

I have had very large experience in the valuation of gas and water works, as between individuals and companies, and as between company and company. I do not take the view Mr. Lloyd has expressed, of valuing the structure, and then putting on something for the business. Invariably, unless there is some special agreement to the contrary—which is very rare—the principle of commercial value is adopted—so many years purchase of the profits. If it be a non-parliamentary company, they are generally taken at 16⅔ years purchase, on the supposition that the tenant is in some risk of disturbance. With regard to a parliamentary company, we give more years purchase, according to the particular circumstances of the trade; in some cases 20 years, in some rather more than 20, in others 19, and so on. I have been engaged very recently in cases of the transfer of gas-works, and have always adopted the commercial principle. I never knew of any one adopting any other principle unless there was an agreement to that effect. There was such an agreement at Sunderland. I was the arbitrator in that case, which was one in which two companies had to be amalgamated, and then they agreed that the purchase should be made on the structural value of the undertaking, but that was only because it afforded a proper means of bringing them together. That was a matter of special agreement, and was made purposely exceptional. I have not made a valuation here. What I have done is to listen to the proofs given of the profits, and I am prepared to state that 16⅔ years is the proper rate of purchase; but as to the amount, I have had no means of forming a valuation. I have had no figures, either of gross or net money received. The case is a peculiar one. I have had no means, in consequence of the mixed position of Mr. Burdon and Mr. Church, of knowing the facts, and I have not sought to know, but I have heard what Mr. Spice has said upon the subject.

Mr. DAVISON: Do you take the value upon the last year, or do you go back any number of years and group them?

Witness: It is always taken at what was last arrived at in the fair way of business. We do look back, but only to see whether the increment of the last year is fairly obtained. We take that as *primâ facie* value, and multiply it by 16⅔ purchase. We then look at the premises, and ascertain whether they are worked up to their full power. In some cases they are worked past the full, and then we make deductions. If they are not worked up to the full, and are capable of doing a larger business, we add something for that larger business. We do not value the profit that is to be made, but value the structure so far as regards its greater undeveloped utility. We then look, on the other hand, at the state of the concern—whether it is in a dilapidated or in an ordinary going condition. If it is dilapidated we make a deduction for repairs. We also inquire whether the works are subject, as very frequently happens, to rent-charges or anything of that kind; and if they are, or are held upon lease, then, having got their value as freehold, we have by means of tables to reduce them to a present value. That is the way in which these things are invariably done.

Mr. DAVISON: Of course, if any new machinery just bought is upon the premises which has not been used for the purpose of production, you would allow for that?

Witness: I should allow for that; but this is a point upon which I differ a little from Mr. Spice. I think the exhauster is a proper thing to be had upon the premises, and that nothing should be allowed for it.

Mr. BARLOW: Do you think the exhauster will go materially to increase the profits?

Witness: Not materially, at the rate at which gas is being made. It will eventually, because the cost of working the exhauster, which has to be set against the improved quantity of gas obtained, will be a deduction. Where the quantity of gas made is small—where it does not much exceed 70,000 or 80,000 feet a day in winter—an exhauster in the end is not much benefit, I mean commercially. It is a very proper thing to have on the premises, but there is the cost of working it to take into account. The cost is very little when spread over millions of feet, but it is considerable when spread over a small amount. All stock in trade has to be taken at a valuation in these cases, except those articles necessary for carrying on the business. If there is surplus land useful for future purposes, that is always valued.

Mr. DAVISON: As I understand you, in valuing works you do not value the mere stones or bricks and the plant on the premises?

Witness: No, that is never done, for obvious reasons. It might sometimes happen that works of comparatively small value structurally were developing a very large income. There may have been twenty years work out of them, and they may have been extremely profitable, but all that time the works, as works, would be getting less valuable, while the income was getting more valuable. In many cases in the country large sums of money have been spent on works which are unproductive and a great disappointment. Works have been made in the expectation of a large demand, which has not arisen. If that has been the case for many years, they get less upon the outlay, because it is still the 16⅔ years purchase.

Mr. DAVISON: There is here a piece of frontage land, which is leasehold, and has 47 years to run. You can tell us from tables what the difference in the value is between that and freehold.

Witness: It would not differ more than 1s. in the pound. I have not the tables here.

Examination continued: I designed the water-works in Weymouth. I suppose the pipes have been down 15 years. They are subject to a very heavy pressure, and I have never yet had to repair them.

Mr. LLOYD: You cannot say that of gas-pipes.

Witness: Gas-mains would decay sooner than water-mains.

By Mr. DAVISON: I saw the gas-pipes at the Guildhall this morning, but there is nothing peculiar in them. There are no gas-works in England in which I could not find a hundred such pipes in the course of business—not looking for them, but taking them up day by day as we do for the exchange of services.

Cross-examined by Mr. LLOYD: When service-pipes are like that we expect some leakage; but I ought to mention that leakage in gas-pipes, as distinguished from water-pipes, is that usually for a great length of time there is scarcely any leakage from rotten service-pipes, if the ground is undisturbed, because the gas makes a service-pipe of the ground itself, and there is no leakage; that constantly occurs. If they are picking up the ground, of course a little escape may arise.

Mr. LLOYD: I think, if I remember rightly, Mr. Hawksley is one of the gentlemen who are of opinion that the leakage from service-pipes is the most important part of the business.

Witness: The leakage in London, and in large towns where there is heavy traffic, is chiefly from the connexions between the services and the mains. There is very little leakage from cast-iron pipes. I ought to mention one matter in reference to this question—that very little of what is commonly called leakage is so. Leakage includes every kind of loss, and a large proportion of that loss is occasioned in the meters; another very large

portion is occasioned by the over-burning of the public lamps. There is another portion occasioned by leakage from the service-pipes, and a small quantity from the joints of the iron mains. Altogether I should attribute not more than one-third of the whole amount to the leakage from the service-pipes. The proportion of loss varies very much. There are cases in which it is as much as 20 per cent. It is not so much now as it was formerly, because the business of gas companies is better conducted.

Mr. LLOYD: Looking at these works, which are of old standing, and not the most perfect works, how much should you say?

Witness: They are old-fashioned, but not the less useful on that account. I do not see why there should be more than 9 per cent.

Mr. LLOYD: Why, you say 22 per cent. is not uncommon.

Witness: No; I say it is uncommon. It is not the age of the works that occasions this loss, but a variety of circumstances. The age of a work does not occasion the over-burning of the public lamps, nor loss at the meters. If the meters were old, and if in the case of wet meters there were any perforations in the drum, or in dry meters if the valves were not tight, then, of course, there would be considerable leakage, and that would get worse as the meters got older.

Cross-examination continued: I call gas-making a trade, and so I do a brewery; but I should not value them in the same way. I should value the brewery premises structurally, and I should look at their worth in the neighbourhood in which they are placed. I should value the water if the brewery happened to be at Burton-on-Trent. That would be an important consideration for Messrs. Bass and Allsopp, for some of whom I happen to be engaged. Then I should value separately the two portions of the trade—one the general trade, which I should take at a smaller number of years purchase; and I should value at a higher rate that which arose from public-houses in their own possession. It is a very difficult thing to value a brewery; there is no analogy between them and gas-works.

Mr. LLOYD: But a brewer having public-houses into which he can put tenants, with the understanding that they shall buy their beer of him, foregoes part of the rent for the sake of the monopoly. In no other respect does it vary.

Witness: You see, with regard to that particular portion of his business, he can command the trade in perpetuity, just the same as a gas or a water company.

Mr. LLOYD: Now, take a manufactory generally—a process of manufacture where the articles produced are sold wholesale or retail. In the case of a wholesale manufactory, where they make for export or the like, you would value the premises, the land, and the plant, and give a very small number of years purchase?

Witness: Generally not more than three years, and rarely less than two.

Mr. LLOYD: Then a retail trade—supposing a man had a grocer's shop, you would begin with his interest in the lease, then take his stock, and then give a certain amount for the goodwill.

The UMPIRE: From two to three years?

Witness: Yes.

Mr. LLOYD: Suppose you were valuing these gas-works as if required for the purpose of a railway or a dock—suppose they wanted to extend the backwater here, upon what principle would you proceed?

Witness: In all probability, if they had to be taken under those circumstances, a new station for carrying on the same business—viz., lighting Weymouth with gas—would be provided for them, and the trade would still continue; but, supposing by Act of Parliament or otherwise (if you can suppose such an unusual thing) they were removed altogether and Weymouth left in darkness, they would have to be paid on their profits, because they would lose their permanent profits. You know this is a case of perpetuity and not an ordinary case.

Mr. LLOYD: What is the difference between a trade and a perpetuity? Is not a gas-work as precarious as an ordinary trade?

Witness: Oh, no.

Mr. LLOYD: Take this very case. Here is a company formed under the Limited Liability Act so that there will be competition. There were complaints of the existing works as to the quality and price of the gas supplied, and another company comes and offers to supply for less. What becomes of the original trade?

Witness: The trade is required by Act of Parliament to be purchased up, and no other trade requires to be purchased up.

Mr. LLOYD: You have not taken my position. A company under the Limited Liability Act has no obligations to purchase, and there is competition at once established.

Witness: That is to say, competition is assumed.

Mr. LLOYD: Then I put it, there is a reduction of price and general improvement?

Witness: You are assuming a case different from what has arisen, or, as far as I know, could arise.

Mr. LLOYD: Suppose there was no Act of Parliament—that this was only a limited company—then with the fact that the old works were exposed to a competition so serious, would you still say that it was not a precarious business?

Witness: It would be exceedingly precarious, and it would altogether depend upon the circumstances—the state of rivalry—as to what method of valuation was to be adopted. If the new company could crush the other company's works, they would be of very small value, and they might have to be taken at so many years purchase, but at a less rate of profit.

Mr. LLOYD: But the rate of profit ascertained during the time of competition would be one thing, and it would be upon that the capitalization would proceed.

Witness: Unquestionably; but generally this happens—it has happened here, and it is one of many instances—that the company seeking to introduce itself into a place where there is a non-statutory company are opposed, and Parliament insists as a condition of granting them an Act that they shall buy up the non-statutory company. A great number of such cases have arisen, and in all those cases the 16½ years principle has applied and been adopted. I was concerned in the Glasgow water case on behalf of the corporation, but I do not remember the particulars.

Mr. LLOYD: There was a competition threatened with a supply from Loch Katrine. On that occasion you made a considerable point of competition reducing the value of the old existing water-works.

Witness: Yes. But that was not a competition of this nature; it was a competition of a statutory company with a statutory company. The competition was an accomplished fact.

Mr. LLOYD: Not at the time the valuation was made. It was then with reference to a competition threatened?

Witness: The Gorbals Company.

Mr. LLOYD: That was only a small portion—one-third of the whole. The Glasgow and Gorbals works were united when the corporation, not satisfied with the quality of the water taken from the Clyde, and thinking a better supply ought to be given, interfered, and said unless they took their supply from a purer source competition should be introduced.

Witness: Such a case as that would not diminish materially the value of the property to be purchased. Supposing no rival company were established, but threatened, with the means of establishing itself, that would have an effect on the value of the shares, but would not affect the value of the property generally till something was done. In most cases it would be ruin if a statutory company competed against a non-statutory company. Two non-statutory companies do not and cannot, as far as my knowledge and experience goes, exist together. It was not the case in Weymouth, as there was not a particle of gas supplied by the new company.

Mr. BARLOW: It was a company on paper, without works.

Mr. LLOYD: But it was a company with some powers—the same powers that Mr. Burdon had.

Witness: No; because his works were already here; his pipes were laid, and he would take care that you did not get your pipes down. We should not let you open the streets. There we are—there you are not; that is the difference between the two.

Mr. LLOYD: We could do the same thing that you do?

Witness: No; you could do the same thing to us. You could not make us take up our pipes, but you could prevent our laying others down.

Mr. LLOYD: That is your law.

Witness: And that is your law too.

Cross-examination continued: I have never seen the accounts further than as regards the paper put before me, which I have no means of verifying. In small towns of this kind, 5s. 6d. is an ordinary price for gas. In London, we know there is great agitation for something less than that. It is difficult to say what is the ruling price of gas—I should think between 4s. and 4s. 6d. I have known the Weymouth works for many years; they are not very good nor very bad works. The capacity of their gasholders is 60,000 feet, and the consumption 90,000 feet per day. In a town of that kind, gasholders will always do if their capacity is two-thirds of the day's consumption. In a town where there is a rapid consumption, we give three-fourths; and in large manufacturing towns, subject to the Ten Hours Bill, and where all the gas goes out between four and six o'clock, it requires storeage for the whole day's supply.

By Mr. DAVISON: The dilapidated gasholder is too small; it is not worth repairing. The two together would be amply sufficient.

By Mr. LLOYD: I have looked at the chimney. The top of the shaft has burst, but the other part is good. It is about as ugly a thing as I know of anywhere; but it is no unusual thing for the top bricks of a gas chimney, where they are not protected by iron, to burst.

Re-examined by Mr. DAVISON: The chimney would have to be repaired from the outside, and would cost about £20 or £25. It is, I suppose, about 80 feet high. With reference to the valuation of gas-works, I have recently been appointed sole arbitrator, with absolute authority with regard to the sale and purchase of some small gas-works. No evidence was given, and I was obliged to get my facts as I could; and I gave 16½ years purchase.

By Mr. BARLOW: I recollect sufficient of the Lowestoft case to know the works were purchased upon the commercial principle. The Birkenhead case is not a case in point, for it was a bargain during the progress of a bill through Parliament. We got 22 to 24 years purchase, but that was done by a little pressure upon the purchaser.

By Mr. PENNY: I have not identified myself very strongly with the figures in this matter, simply because I had no means of doing so. My chief knowledge has been obtained by what I heard in this room. The population of Weymouth is about 12,500.

Mr. PENNY: Do you know of a town in England, or in the world, in which, with a population of 10,000 or 12,000, the capital of the gas company is anything like £60,000, which it will be here when this inquiry is finished?

Witness: The capital of a gas company cannot be such an amount, but the purchase of the works may come to that. In Birkenhead, the commissioners had to pay £224,000 for the gas-works; and the Liverpool corporation, when they purchased the water-works, had to pay £800,000, though the works were not worth anything like it; but they had to buy the profits.

Mr. PENNY: I think you would hardly like to be identified with a case in which £60,000 was the capital of a gas company in a town of 12,000 inhabitants?

Witness: I have no objection to be identified with anything I think right, though other people should find fault with it. It is not the burthen of the town, supposing these gentlemen have to pay £100,000. They have simply made a bad bargain. The value must be according to the agreement, and the Legislature made the agreement for the parties.

FRIDAY, DEC. 6.

Mr. DAVISON: Mr. Hawksley wants to make a statement.

Mr. HAWKSLEY: You asked me the difference between a leasehold for 47 years and a perpetuity. I expressed an opinion—and I said I had all the details by me—that it would be about 1s. in the pound. I think, if you correct that figure to 1s. 3d., you will find it right according to the tables.

The UMPIRE: The other portion of the land is copyhold; it is in the nature of a perpetual inheritance; it is renewable.

Mr. DAVISON: In the case of a gas company, in which there is no death, it is as good. There was a fine of 2d., I think, on the last purchase in 1861. You know, sir, there has been a Royal Commission sitting upon water-works, of which the Duke of Richmond was chairman. Mr. Hawksley was called as a witness before that commission, and he has now a print of his evidence. It seems to me, as your only desire can be to get at the correctness of the views we have advanced, that there are three answers which might be laid before you.

Mr. LLOYD: I do not deny the accuracy of Mr. Hawksley's statements.

Mr. HAWKSLEY: It has only to do with the principle, and not with the figures.

Mr. DAVISON: There being nothing in litigation in that case—no claim to satisfy—it seems to me that it would be valuable to have this vidence on the notes, at least.

Mr. LLOYD: I asked Mr. Hawksley whether he had not made a larger allowance in the valuation in respect of competition.

The UMPIRE: I think, generally speaking, the evidence before a commission of that sort is of such a wide description that we could hardly adopt it.

Mr. BARLOW: It was one of the objects of that commission to ascertain the terms upon which such works should be purchased.

Mr. HAWKSLEY: Yes, and I was asked particularly by Sir John Thwaites upon that subject, and I gave him the information he desired.

R. N. Howard, Esq., examined by Mr. DAVISON.

I am a solicitor residing in Weymouth, and have acted for some time for Mr.

Burdon as collector of the gas and meter rents and the public lamp rents. Mr. Crocker has been my clerk during a portion of that time. I have the books here. This [producing a book] is the cash-book spoken about yesterday.

The UMPIRE: How long has Mr. Howard been Mr. Burdon's collector?

Witness: I cannot exactly tell, but I think it is about five years. I fancy I began in the year 1862.

By Mr. DAVISON: This is the original cash-book, showing the actual cash receipts, but, to facilitate the inquiry, I have had a copy made of the accounts commencing with 1863.

Mr. DAVISON: The other books show what was receivable.

The UMPIRE: There was only a small per centage to come off.

Mr. DAVISON: That is as I should put it, but I dare say you will find during the agitation that the receipts were not got in so well.

Mr. PENNY are these the gas-rents only?

Witness: The meter-rents and public lights. They are separated for this reason. that Mr. Church took a greater proportion of the receipts from the public lights. The rent for the hire of meters is quite distinct.

Cross-examined by Mr. LLOYD: The books were audited every quarter. Mr. Church has been accustomed to deliver to me quarterly an account of gas consumed, according to the meter. This was entered into a book, and I had to collect the amount due. He generally did that within a week or nine days after the expiration of the quarter. I do not think it ever exceeded a fortnight. The account was delivered to me in the form of receipts, in a cheque-book, of which he filled in the counterfoils and my clerk the other portion as the money was received. Every week, on Saturday, through my clerk, I paid the money collected into an account at the bank, called the "Weymouth Gas Company's account;" and whenever I thought the cash in hand was sufficient to divide, I drew a cheque, and sent so much money to Mr. Burdon, and paid so much to Mr. Church, in the proportions indicated in the contract. I did not draw out the whole money, perhaps, but left a few pounds in the bank. At the end of the quarter Mr. Burdon's auditor—Mr. John Brown—used to audit the accounts, and I had to produce to him the receipts showing what I had collected and what there was in arrear—Supposing there was £20 or £30 to be paid to Mr. Church or Mr. Burdon to make up their shares, that was done each quarter, and the balance paid according to the contract. In Weymouth the arrears are somewhat different in various quarters. In certain seasons we can collect better than in others; but, on looking through these accounts, I find they have hardly varied by £100. In March, 1867, I paid Mr. Burdon £409 11s. 3d.; in December, 1866, I paid him £401 14s. 2d.

Mr. PENNY: Are these computed amounts, or are they the exact sums due to him?

Witness: They are the quarter's share under the contract, after deducting my proportion of the expenses.

Mr. PENNY: Not a sum on account?

Witness: No: his share—his net return.

Mr. PENNY: The first item you gave represents his share for the quarter up to March, 1867.

Witness: Yes, £409 11s. 3d. The previous quarter it was £401 14s. 2d.; to Sept., 1866, it was £385 13s. 4d.; and to June, 1866, £246 13s. 6d.

Mr. PENNY: Are these purely gas-rents—his share net, or are they subject to any deductions for charges incurred by Mr. Church?

Witness: No; no deductions chargeable by Mr. Church.

Mr. LLOYD: By-and-by we shall see what charges Mr. Burdon paid.

Mr. BARLOW: As I understand it, this is net money, which found its way into Mr. Burdon's hands with half the rates and taxes taken off.

Witness: No, it has nothing to do with that.

Mr. LLOYD: This is his share of the gross receipts.

Witness: The only payments I had to take off were my own commission, receipt stamps, postages, and stationery. I did not pay a single rate or tax.

Mr. BARLOW: He had his half share of rates and taxes and his proportion of working expenses to take off.

The UMPIRE: That Mr. Howard had nothing to do with.

Mr. DAVISON: This is simply the meter-rents and public lamp returns.

The UMPIRE: Mr. Burdon's share of the gross receipts *minus* the expense of collection—the expenses incurred by you and deducted by you?

Witness: Yes.

Mr. LLOYD: Your commission was 4 per cent., 3 per cent. of which was charged to Mr. Burdon, and 1 per cent. to Mr. Church—the contract says so.

Cross-examination continued: Mr. Burdon's share for the quarter ending December, 1865, was £290 8s.; September, 1865, £226 14s. 4d.; June, 1865, £274 13s. 3d.; March, 1865, £347 18s. 11d.; December, 1864, £339 0s. 8d.; September, 1864, £234 17s. 1d.; June, 1864, £187; March, 1864, £310 5s. 3d. December, 1863, £396 15s. 3d.; September, 1863, £190 17s. 11d.; June, 1863, £240 5s. 9d.; March, 1863, £326 6s.; December, 1862, £329 14s. 8d.; September, 1862, £150.

Mr. PENNY: The latter is something on account, evidently.

Witness: That is all; I cannot go back further. At that time there were changes; and my clerk, who attended to the gas collecting, was ill, and the doctor ordered him to give up, so the collection got into arrear.

Cross-examination continued: In March, 1866, the arrears were £1112 7s. 6d. the next quarter they were reduced to £896. In March, 1867, the arrears were £1226—in fact, £80 more than in the previous year. I cannot tell what they were when the works were handed over to the new company, in June, 1867, as my clerk has been engaged in other ways. The arrears in March, 1863, were £521 16s. 5d.; March, 1864, £585 5s. 1d.; March, 1865, £799 4s. 4d. The public lamps are not always regularly paid—they are sometimes £150 in arrear, sometimes £128, and so one. The number of public lamps increases year by year. The gas-rental book and the cash book together will show what is lost upon collection. We have received all that has been brought to charge, with the exception of a few computed accounts.

Mr. DAVISON: The book is before you with the total sums charged and added up, as taken from the meter-book, and it appears there were a few pounds received more than charged. In 1866 the total gas-rental was £4117; in 1865, £4118; in 1864, £4148; in 1863, £4120; and in 1867, £4830.

Witness: In March, 1865, the arrears were £790, and in June they were £998. That I attribute to various circumstances connected with myself privately.

Mr. BARLOW: Then the arrears have increased from £799 in 1864 to £1226 in 1867.

Mr. LLOYD: Can you explain at all to what the increase in the rental during the last year was due?

Witness: I attribute it to the number of new buildings erected, and the greater consumption of gas. My clerk can tell what increase there was in the quantity of gas supplied. I do not know how many new houses have begun to be occupied.

Mr. BARLOW: You can tell, perhaps, how many new consumers there have been in the year?

Witness: My clerk can.

The UMPIRE: The rate of charge remains the same?

Witness: Yes; there has been no alteration made.

Mr. *T. Crocker* recalled, and examined by the UMPIRE.

I can only refer the increase in the rental of the last year to the severe season, and to the fact that most of the tradesmen burned gas during the day. There were some two dozen fresh consumers.

Mr. LLOYD: The winter happened to be a bad one, and there was more gas burned?

Witness: Yes.

Mr. *Howard:* A great many shops burned gas during the day, I know, for warmth.

Cross-examination of Mr. *Howard* continued.

I have been in Weymouth nearly 20 years. That was about the time when the railways came here, and there was a spurt of new building then. That has not ceased; there are many new houses building in the Dorchester Road—a whole terrace of houses. There have been new churches and chapels, and other large buildings. Within the last three years a new Congregational Chapel has been built. There have not been many additional shops, but there have been great alterations made. The shops could not increase in number, the ground being covered; but small shops have been made larger, and plate glass has been introduced, which requires more light. That has not all taken place in one year, but has been going on all the time. I am aware that there have been great complaints among the gas consumers, and an agitation has been going on for some time. I was not the unfortunate recipient of the complaints, though a customer would sometimes say to me, "My bill is so and so." The general complaint was respecting the price, and they said it was bad gas.

Mr. PENNY: Was it not also the insufficiency of supply?

Mr. BARLOW: They were told so by Mr. Flintoff.

Witness: I do not think there was an insufficiency of supply. In my own house I have found the gas burning freely, when two doors lower down there was a complaint of a want of gas, which was simply because the service was not large enough, for it was connected with the same main.

Mr. LLOYD: Who puts in the connexions—the service-pipes?

Witness: That I do not kow. Many persons have a service-pipe for three lights, and then perhaps increase their burners to twenty, and expect the same service to supply them. I know in two houses there was just that class of complaint.

Mr. LLOYD: You have no account of what was paid by Mr. Burdon for gas-mains or repairs?

Witness: No; I never had it in any shape or form. The only question between Mr. Burdon and me was as far as regards the principal main the other side of the water, by which, for a very little outlay, a considerable income will be brought in, of which the new company will have the advantage.

Mr. BARLOW: Who is Mr. Flintoff? You have mentioned his name—who is he?

Witness: Goodness knows.

Mr. BARLOW: Is he a resident here?

Witness: No. I understand him to be a gas agitator—that is his profession.

Mr. BARLOW: He was sent for to stir up the agitation?

Witness: No doubt about it.

Mr. LLOYD: Did not the complaints exist before the agitation?

Witness: I do not know. I know that he gave a most graphic description of the wrongs of the consumers, and quoted Shylock at one of the public meetings.

The UMPIRE: He quoted Shakespeare. Who was Shylock—Mr. Church or Mr. Burdon?

Witness: Goodness knows; I do not.

Mr. LLOYD: When was the first public meeting held here about gas?

Witness: I am sure I do not know.

Mr. LLOYD: Long before Flintoff came?

Witness: No. I do not remember the day.

Mr. LLOYD: The vultures do not come till there is a carcase.

Mr. *Robert Church* recalled, and examined by Mr. CLERK.

Mr. CLERK: In the account given in by Mr. Howard of moneys paid to Mr. Burdon, I see the amount in the month of December, 1865, was considerably less than the amount paid in December, 1864, or even 1863 or 1862. In 1865 the amount paid to Mr. Burdon was £290; in 1864, it was £339; in 1863, it was £396; and in 1862, £329. The gross rental, I find, in December, 1866, was £1436; in 1865, £1348; and in 1864, £1263; whereas in 1863 it was £1358. Now, can you account for the great falling off in the quarter?

Witness: No; unless at other times the collection was a little more diligent. But it may be accounted for by a large sum having been paid on account of the public lamps. Not having my books before me I cannot tell.

Mr. *Burdon* recalled, and examined by Mr. DAVISON.

Mr. Lloyd asked me the other day for some accounts, as between me and Mr. Church, of expenditure in the nature of repairs and extensions chargeable to me. I came up not knowing upon what points I should be examined, and have not all the accounts with me. I can give a general statement as to what money was laid out, but I cannot give details. I have so many affairs to attend to that I could not do it without my bookkeeper.

Mr. LLOYD: You see at once it is important to my clients to know first of all what extensions have been made, and then to see what effect they have had upon the rental. Another thing is to know what ought to be brought to revenue as distinguished from that which belongs to capital. All these things were paid by you except ordinary wear and tear, and I want to know what the proportion was, if you can classify and distinguish it. There must be some means of doing it.

Witness: Yes; if I were at home I could satisfy you on the point.

Mr. LLOYD: Can you give it generally, and then, if we are not satisfied, we will ask for more?

Witness: I find there has been expended upon the gas-works from the beginning about £27,000.

The UMPIRE: Do you mean that this is the expenditure for all purposes since you first set them up?

Witness: Yes; and for about five years, previous to Mr. Church's time, I had to send down about £500 or £600 a year for the purpose of carrying on the works. Some portion of that £2500 would no doubt be spent on extensions if they were required. That was up to within about two years of Mr. Church's lease. Then when the arrangement was made last year £12,000 was awarded to Mr. Church, about two-thirds of which has been paid. When it is all paid that will be the gross capital of the undertaking.

Mr. LLOYD: We have nothing to do with that award, I am happy to say. I am not going to trouble my conscience about that.

Mr. DAVISON: Surely, if this is not a dishonest transaction—if Messrs. Paddon and Spice are not a pair of conspirators—then, sir, this is a good valuation. There is nothing short of that can take away from the value of the award.

The UMPIRE: They may have been too honest, and so have made a bad bargain for one of them.

Mr. BARLOW: A part of that award represented stock handed over, and a portion represented authorized extensions.

The UMPIRE: We have not come to the award at present.

Witness: Independently of that, I merely look at it in this way. The mode of valuation adopted by these gentlemen was to take the net receipts and not the gross receipts. Whether I got that income from £5000 or from £50,000 makes no difference in the price I should get for the gas-works.

Mr. LLOYD: I want to know what has been done from time to time in extending these works to make them more productive, and what has been expended in the shape of actual renewals. What you have had to pay in respect of the works which you consider to be extensions to be afterwards productive, and that which was spent to keep the works up to a state of efficiency? The cheque-books and counterfoils would tell that.

Witness: I did not keep a separate bankers book for this concern.

Mr. BARLOW: The account Mr. Lloyd wants is the account of what Mr. Burdon has received in the shape of his proportion and what he has paid out of it, first, in the shape of rates and taxes, then for extensions, and next for repairs.

Witness: You wish, as far as I understand you, to reduce my income from the working, having the interests of your clients at heart. But here is the awkwardness: I received an income of £4000 or £5000, and if any extensions were required I paid for them. I find that the gross receipts to me last year, up to March, were £1533 18s. 5d.

Mr. BARLOW: We have it as only £1483 13s. 3d.

Witness: These were the gross receipts. Then we have to deduct commission, rent of meter-room, stationery, carriage of meters, &c., £138 9s. 7d., leaving £1395 8s. 10d. as the gross receipts. This is from my own auditor's account.

Mr. LLOYD: What I want either Mr. Burdon or Mr. Church to give me is, what has been the actual expenditure in extensions and renewals—whatever Mr. Burdon by his contract with Mr. Church was bound to repay.

Mr. DAVISON: How can he, when no account was taken between the parties till the award was made?

Mr. LLOYD: Mr. Church was bound to keep an account.

Witness: Mr. Church can tell what he himself has expended. Some of the things he charged to me.

The UMPIRE: Then you paid a certain sum for it. Out of the two together we can get at it.

Mr. BARLOW: But Mr. Burdon does not know how much of the sum which was awarded to Mr. Church was due to extensions.

Mr. DAVISON: He cannot know, because that was a matter of dispute between the parties.

Mr. LLOYD: That I understand; but if you will tell me what was done I can tell you whether it was renewal. That which is to be replaced for that which is worn out is renewal. That which is extension has to go to capital.

The UMPIRE: Would not the best thing be to get the gross sum, and then divide it afterwards?

Mr. DAVISON: Mr. Spice is the only person who can tell. Mr. Burdon does not know in respect to those three years what was paid for extensions.

Witness: I did not settle accounts half yearly with Mr. Church; some of them went over three years.

Mr. DAVISON: Here is the test-book, which is what Mr. Lloyd asked for. [Producing book.]

Mr. LLOYD: We really must have these accounts. (To Mr. Church:) You know what you charged Mr. Burdon in respect of the payments you made?

Mr. *Church:* I will endeavour to get at it.

Mr. DAVISON: How can £27,000 be said to be the value of the works when Mr. Burdon has to pay £12,000 before he gets possession of them?

The UMPIRE: Mr. Burdon has said that £27,000 was the outlay upon the works beside the £12,000.

Mr. LLOYD: There was £2500 he said sent down at different times.

Mr. BARLOW: £2670 was for the goodwill, beneficial or other interest or right of the said Robert Church under the said indenture, together with all and singular the trade fixtures, utensils, mains, stores, barges, and other effects, &c., used in carrying on the works; and then there is a sum of £2642 due from the said Burdon to Church for questions of account referred to me.

Mr. LLOYD: That is for renewals—for moneys spent by Mr. Church.

The UMPIRE (to Mr. Barlow): You took the figures?

Mr. BARLOW: No; some of them were taken for me, and some of them I found myself.

The UMPIRE: But the great bulk were agreed upon by Mr. Paddon and Mr Spice.

Mr. BARLOW: Yes.

Mr. DAVISON: Did you settle the £10,000?

Mr. BARLOW: No; the £10,000 was agreed to by Mr. Spice. I settled the others.

Mr. LLOYD (to witness): You bought a small piece of land—three-quarters of an acre?

Witness: Yes; I paid £140 for it.

By Mr. DAVISON: The land has been very much improved since 1861. It is a bit of land, the frontage of which I leased from the corporation, and upon which I made a well.

Mr. *Howard* recalled, and examined by Mr. DAVISON.

Part of the land just mentioned was made by refuse from the gas-works, and the rest by piles driven in the water. That is the ground upon which the new company are placing their gasholder. Every year helps to make the land.

By Mr. LLOYD: A portion of the piles were actually in the water—considerably more than a yard.

The UMPIRE: The edge, whatever it was, was his property; he did not take a lease of it.

Mr. DAVISON: Yes. It is odd he took the frontage of this in 1838, when he purchased the 5-acre field. He also purchased a piece, to let Mr. Dodson have it, and then they reclaimed it, and when Mr. Dodson died his executors sold it to Mr. Burdon. If you look at the 505 feet you will see it is so. [Plans examined.]

Witness: When this land was sold there were piles, and every year has increased the value of the land. If any other person had bought the land at that time, he would have had to bring the material there; but the refuse from the gas-works has made it up to the total frontage of 539 feet.

The UMPIRE: Is it true that the lease by the corporation of the 505 feet includes the land up to the frontage of the land held by Mr. Burdon at the time?

Witness: The frontage went beyond the line then.

Mr. *Church* recalled, and examined by Mr. LLOYD.

I have the book containing all I had to pay under the contract. I also know what I received from Mr. Burdon.

Mr. BARLOW: You will not know what you received under the award on account of extensions.

The UMPIRE: That is another thing. You see the parties are not agreed, and the arbitrator settles the matter on both sides.

Mr. LLOYD: What we ask for is the pressure.

Mr. DAVISON: Here it is—pressure and illuminating power. On Jan. 26, 1867, I see 13 candles—averaging 13·10.

Mr. PENNY: At what hour?

Mr. DAVISON: There is no hour given, but the witness told you that he generally took the pressure when persons were burning the gas. (To witness:) Where was the pressure taken?

Witness: In the town, at the office. The book now produced, headed "W. W. Burdon, Esq., in account with Robert Church," was kept by Mr Waters, and gives the accounts for 1863. The accounts subsequent to that year were sent to Mr. Spice. I can give an account, but I have not the book. Mr. Waters has a copy of it. [Produced.]

Mr. LLOYD: The part I was looking for was this—"Total amount claimed for mains and services laid from Jan. 1, 1864, to June 30, 1867, £699 19s. 4d." Then Mr. Spice said there was a great question whether they ought to be charged to Mr. Burdon, and so 15 per cent. was taken off as a rough calculation. That is for extensions and new service-pipes.

Mr. CLERK: I believe that is for altering the mains. The mains themselves were sent from Newcastle by Mr. Burdon.

Mr. LLOYD: Then, Mr. Burdon, can you give us an account of what you sent in mains and pipes?

Mr. *Burdon:* I cannot tell off-hand, but I have no doubt I shall be able to give it you. They are included in the £27,000.

Mr. CHURCH: If there are 1000 yards of mains charged, there were 1000 yards sent. At the closing of that account Mr. Burdon distinctly told me by letter he would not expend any more money at all upon the works. I kept on owing those things, and when the crisis came I sent in my bill. I did not put it into the account. I knew that, if I did not spend the money, there would have been a greater storm in the town than there was. This last book is all for extensions. There is an item for repairing mains on the quay opposite South Parade, but they were repairs occasioned by an accident, which Mr. Burdon was bound to make.

Mr. *Burdon,* in reply to Mr. LLOYD, said he had no doubt that, for certain purposes, he had laid out £400 per annum for years.

This closed the case for Mr. Burdon, and Mr. Lloyd and his witnesses retired for a short time. On their return,

Mr. LLOYD said part of his case was that he took the value of the undertaking to be the value of the buildings, the works, tanks, delivery-pipes, reservoirs, &c., and then arrived at the rest from that.

The UMPIRE asked if there was anything meant by the words "terms and conditions" in the purchase clause.

Mr. LLOYD imagined it referred to the time and mode of payment.

Mr. DAVISON thought there was nothing special in it.

The UMPIRE said it looked as if it had been put in for some special purpose.

Mr. CLERK: Probably it refers to the period in which the money is to be paid.

Mr. LLOYD: Or the rate of interest; and that is again provided for by the Act, because Mr. Burdon has a right to collect in the rents in the meantime, and has a lien upon the receipts for the payment of the purchase-money and interest.

Mr. *G. R. Crickmay,* examined by Mr. LLOYD.

I am an architect and surveyor, and have carried on business at Weymouth for 11 or 12 years. During that period I have had considerable experience in measuring and valuing works and buildings. I have made a valuation and measurement exactly of the buildings connected with the works, and the tunnel which passes under the backwater. I valued it in the first place as if it were new brickwork to be put up. I value the buildings for the manufacture of gas, including retort-house, coal stores, cottage and office, engine and meter house, gasholder and tanks, lime-kiln and shed, wharf and boundary wall, at £3832. I consider the depreciation of the buildings is very much in some places; I take it at £574, which is 15 per cent. upon the whole. That would reduce the amount to £3258. The tunnel and shafts I value at £3854, and deduct for depreciation £198, being about 5 per cent. They are in much better condition. That reduces the amount to £3656. I have taken 1 acre and 28 perches of copyhold land at the sum of £235, which is at the rate of £200 per acre. The leasehold land—2 roods 36 perches—having 45 years unexpired, I value at £166, being at the rate of 20¾ years purchase. That would be £8 annual value.

Mr. BARLOW: It is £200 per acre at 4 per cent.?

Witness: Yes. That makes the valuation altogether £7265.

Examination resumed: In putting my valuation upon this land, I have been guided by my own knowledge of land situated as this is. Weymouth is at this moment increasing steadily, but very slowly. There was a time when it was progressing more rapidly than it does now.

Cross-examined by Mr. DAVISON: I have never valued gas-works before. I did not take off 20 years depreciation, because I considered £574 was a sufficient amount to take off. There are two shafts—one in the backwater, and one this side of the backwater—leading down to the tunnel. I went into the tunnel; it is in good repair. I have no notion of what a tunnel would cost to be constructed at that time. The land would work out to 10d. per yard. I do not call this building land. I have sold some building land in a thoroughly good position, with a good view of Portland, at £350 an acre—magnificent building land, well supplied with water, and sloping to the south; in fact, in the best position in Weymouth. I have not sold any land anywhere near the site of these works. There was a piece sold at £180 an acre, but I was not present at the sale. I should not think frontage to the water has value, except it is water which you can get to. I value the leasehold which has frontage at the same price as I value the copyhold which has not, because it is entire. I know the gas-works have no compulsory powers to take land. I have built about 70 or 80 houses in Weymouth and the neighbourhood.

Mr. DAVISON: Supposing you had a pipe or a well of mineral water, and the receipts from that water were £1000 a year, what would you value it

at if the cost of getting the water up was £100? Would you value the bricks and mortar?

Witness: That was all I was asked to do here. No doubt the water would give a value to the well.

Mr. BARLOW: Your valuation is one as between the contractor and the party for whom the works are erected—merely structural value?

Witness: Yes; what it would cost to build, supposing the company had to build new works, instead of buying these.

Mr. *J. Hicks*, examined by Mr. LLOYD.

I am an architect and surveyor at Dorchester. I know Weymouth well. I have carried on business for 30 years—16 at Dorchester. I have valued structures. I quite agree with Mr. Crickmay's valuation, both as to the buildings and land.

Cross-examined by Mr. DAVISON: I have never valued gas-works before, but I have structures placed in water. I have never been down in this tunnel. I have laid out some land in Weymouth, in the road leading to the bridge, for gardens. I let it at £2 per quarter of an acre. I was engaged in valuing the Portland Railway, for the railway company.

Mr. *R. Thomas*, examined by Mr. LLOYD.

I am deputy-chairman of the new Consumers Gas Company, and have carried on business in Weymouth for 30 years. I am also a Town Councillor and a guardian. I have observed for some time past the state of the gas supply to the town of Weymouth and Melcombe Regis. There has been a great deficiency of supply previous to the agitation. The quality was much improved after that period; before that it was inferior. I am myself a consumer. I judge from my own gas. It was a very deficient supply, more particularly in the morning at two or three o'clock, when we were unable to get gas at all, and were often obliged to have candles to carry on the business.

The UMPIRE: That is very early in the morning.

Witness: That is from my occupation. I am a confectioner.

Examination resumed: My attention was first directed to the matter from the complaints in the council. I made it a rule invariably, when I called my men, to take a walk up to the end of the street, both winter and summer. I observed that the public lamps were just like a candle flame. I believe they are bat's-wing burners. I spoke to Mr. Church about the quality and price of gas. I told him I did not wonder at the people complaining, as the price was excessive. I also complained about the quality and the deficiency of supply. Mr. Church's reply was that it was better than the Act required.

Mr. DAVISON: I do not see why we are bound by what Mr. Church said.

Mr. LLOYD: I do not think you are. I was going to put a veto upon it.

Examination continued: We pay about two guineas each for the public lamps. I do not exactly know what the total cost is.

Mr. BARLOW: The evidence stands that there are 245 public lamps, for which they pay £551 a year.

Mr. LLOYD: Did you understand at all that there was a company existing before your company was formed?

Witness: We had no other idea but that there was a company. Mr. Burdon protested that he was a company, and that he did all that a company under the Act of Parliament was required to do, and that if we resisted him we should find to our sorrow that he had full powers.

Mr. DAVISON: What has this to do with the case? The question was never put to Mr. Burdon. You should have asked him. You have no right to give a conversation in which he was engaged without asking him the question.

Mr. LLOYD: I only want to know whether the people in the town believed it was a company or Mr. Burdon supplying gas. He could not tell me that; this gentleman can.

Mr. DAVISON: Mr. Burdon could tell whether he held himself out as a company.

Mr. LLOYD: That I do not ask.

Examination continued: I was present on the occasion of the burning of the books, which took place on the works. I went with Mr. Penny and our manager to take possession. I will undertake to say positively that there were no books of that description [pointing to the second book of Mr. Church's] among the papers burnt. There were no books; nothing but bundles of invoices and some loose papers. I asked Mr. Church, as I thought it was very curious, why he was going to destroy them. He said he was going to do so when he was all right. On the Monday following I went and looked into the furnace to see if there were any unburnt portions that I could gather anything from. I did not look at the papers on the Saturday. All I could see was some portions of burnt paper the size of my hand, which had been pressed together, and so had not got burned. I turned them over, and found they were invoices, and had figures upon them, and that was all I could find. There was not the slightest trace of bookbinding. The engine was stopped almost immediately afterwards. Mr. Church merely went to another part of the buildings just as the papers were put in, and I called a man and had the engine stopped.

Mr. LLOYD: Has the quality of gas improved under the new management?

Mr. DAVISON: To ask the vice-chairman of the company is hardly the thing.

Cross-examined by Mr. DAVISON: I did not expect to see any bookbinding. I went to see if there were any papers unconsumed. I did not take any of the pieces of paper away. I did not see more than one box full of papers, and there were no books there.

The UMPIRE: Mr. Waters said there were two boxes that he had to remove.

Mr. LLOYD: Yes, speaking of them at the office; but he never spoke of more than one box being taken to the works.

The UMPIRE read his notes of Mr. Waters's evidence.

Cross-examination resumed: Mr. Penny is our consulting engineer. We have a manager, and pay him £150 a year. I cannot say whether we make as much as 100,000 cubic feet per day. I live between the railway station and the gas-works. The railway company have signal-lamps at the station supplied by the company.

Mr. DAVISON: I suppose, if the public lamps were in the state you speak of, there would be a deficiency of light at the railway station in a greater proportion.

Witness: I should think so.

Mr. DAVISON: Do you know whether there has been any complaint at the railway station about the signal-lamps being deficiently supplied?

Witness: I do not know whether they use the gas. They used to use oil. We supply the railway company by meter.

Mr. DAVISON: You are the vice-chairman—do you not know that there has been complaints from the railway since the new company have had the gas-works?

Witness: I know on one occasion the station master came to me, and I immediately sent the manager of the works to him. He did not complain that we had not supplied the signal-lamps with gas; but that they could not see when first they lit the lamps of an evening.

Mr. DAVISON: Did he not tell you that he never had had a complaint in Mr. Church's time?

Witness: No; he never mentioned anything of the kind.

Re-examined by Mr. LLOYD: On the occasion of the burning, I was at the works from twelve to three o'clock, I think. After the burning, I waited nearly half an hour, going round with Mr. Spice and Mr. Penny. The papers were taken by the man in his hand, and pitched into the furnace. If there had been a book, I must have seen it.

Mr. *G. Seaman*, examined by Mr. LLOYD.

I am the borough surveyor of Weymouth. I have been engaged in building operations as surveyor for a great many years. I was, formerly, also with Mr. Dodson, who was Mr. Burdon's agent. I remember the building of the gas-works. They were built by Mr. Dodson. I have gone over the works lately with Mr. Crickmay, and carefully surveyed them. I have heard Mr. Crickmay's valuation of the buildings, and agree with him. I consider it a fair and full estimate of the value.

Cross-examined by Mr. CLERK: I never valued a gas-work before.

Mr. CLERK: You could not tell me what other site there is in Weymouth to put gas-works on but the present one?

Witness: Yes; there is a very good site on this side the backwater, by the side of the railway station. I believe that Mr. Burdon proposed to put his gas-works in that direction in 1888, but he was stopped by the corporation. That is why it was necessary to make a tunnel under the backwater.

Re-examined by Mr. LLOYD: Since that time things have improved in Weymouth. A great part of the land by the side of the railway is vacant.

THURSDAY, JAN. 16.

The sittings were resumed this day at the Westminster Palace Hotel, London.

G. W. Stevenson, Esq., examined by Mr. LLOYD.

I have had 20 years experience in the construction and management of gas-works. I have made a careful examination of the Weymouth Gas-Works. I think the structural value of the works, as given by Mr. Crickmay, is high; I should not myself value them as high. I estimate the value of the whole of the manufacturing plant—retorts, washer, condenser, purifiers, gasholders, engine, boiler and exhauster, pumps, pipes and valves on the works, and the other machinery—at £2225. The mains and pipes I have put at £2129; meters and fixing; £789; services to meters and lamps, £394; lamp-posts, brackets, lamps, &c, £444; materials, tools, fittings, &c., in store at the works, £1555. That is all the stock in trade which was agreed to be taken first of all by Mr. Burdon from Mr. Church, and afterwards from Mr. Burdon by the company. I have gone carefully through these calculations, and applied the principle I am in the habit of applying in like instances. I have also considered what would be required to bring the works up to an efficient state. A large portion of the plant is in a very bad state. I have here a statement of the items of expenditure necessary to put the works into a proper condition [paper handed in]. It is not an element in the structural value. If you take structural value and goodwill this does not come in, but if you go upon the commercial principle then it does come in.

Mr. BARLOW: This is a corresponding item to that for which Mr. Spice put down £600.

Witness: Yes; if it was £600. I forget what Mr. Spice stated, but he made some statement of the expenditure necessary to put the works into going order. This is my valuation of what is absolutely required for that purpose.

Examination resumed: The first item is for an enlarged hydraulic and communicating pipe, additional lids and screws, and to renew the retorts where worn out—35 retorts at £6 each—£210. Then there is required one setting of new retorts, and adaptation of house, £20 each, £120. Then there are required new lids to purifiers and new grates, for which I put down £100. Then sundry valves require to be altered, to work the purifiers in rotation, £25. The old gasholder ought to be removed from the tar-tank, and the tank covered over. At present it is not in a safe state. That I put down at £80. The present governor and connexions are much too small, and they ought to be removed, and a new governor put in, and new connexions, for which I have put down £40, which is the difference in value between the present governor and the governor that ought to be in use. Then there are no by-passes to the washer and condenser; there ought to be, and that would involve some rearrangement of the pipes in the works. For that I have put down the very small sum of £42. Then more than one-half of the pipes in the town are of 2-inch diameter. It is manifestly wrong it should be so, and there ought to be an expenditure of £592 to bring the pipeage up to an average of 4 inches. Then there are 841 yards of wrought-iron pipe used as mains, which ought to be taken out, and 2-inch socket-pipe put down, which would cost £95; making a total of £1304. I have also an estimate of the working of the concern, which is the result of my own practical experience for works of this magnitude. [Paper handed in.] It is an estimate of the income and expenditure, on a carbonization of 2200 tons of coal, producing 9500 feet of gas per ton, and allowing 16 per cent. unaccounted for, which is 3,344,000 feet deducted from 20,900,000. We thus get 17,556,000 feet of gas for sale, of which the public lamps take 3,721,000. I do not quite agree with Mr. Waters's computation of the quantity consumed by the public lamps. This estimate leaves 13,835,000 feet for the private consumers. It is a fact that the company are now losing 16 per cent.; that is rather more than I usually allow, because I think works ought to be kept in such a state of repair as to allow a less leakage than 16 per cent. It requires constant repair and supervision, and considerable annual expenditure in the renewal of service-pipes and so on, in order to keep down the unaccounted-for gas; but I believe it may be kept down. The average of the loss in London is 16 per cent.; I think it ought to be less. The average leakage account throughout the kingdom is somewhat below that. The income from the sale of gas to private consumers at 4s. 6d. would be £3112 17s. 6d.; from the public lamps, £552 18s.; and meter-rents, £160. Then there would be realized from the sale of 953 tons of coke at 13s., £619 9s., and from the sale of 22,000 gallons of tar, at 1d. per gallon, £91 14s.; making a total income of £4516 18s. 6d. The expenditure would be 1980 tons of coal, at 15s. 8d. per ton into the works, £1551; and 220 tons of cannel—being 10 per cent. on the whole, in order to bring up the illuminating power to 14 sperm candles—at 25s., £275. Then materials for purification, £65 6s. 3d.; labour in manufacture and distribution, £495; salaries, £330—consisting of a manager, £150; secretary, £100; and one clerk at £80; directors and auditors, £150; collectors, £55 10s.; law, £25; bad debts and allowances, £57; repairs to works, mains, meters, &c., £348 17s.; office-rent, rates, and taxes, £111; incidentals and general charges, £42; depreciation and renewal, £126; and interest upon £1000 floating capital, £50; making a total expenditure of £3361 13s. 3d., and leaving a net annual

profit of £855 5s. 3d. I cannot conceive it possible that a profit of £3340 9s. could be realized from a concern like this; it is quite contrary to all my experience. There are many omissions in the expenditure. The income from all sources was put down at £5749 12s. 1d., and the expenditure at £2409 3s. 1d., leaving a profit of £3340 9s. Supposing the works had been in the hands of a company, and had been managed in the usual manner, the following items of cost would have to be deducted from that net profit—cost of purifying materials, £61 3s.; and I would here remark that, although on behalf of Mr. Burdon the statement was made of the profit of burning lime, there was nothing at all put down for the cost of the limestone from which the lime was obtained, the fact being that the lime was obtained, no doubt, when the men would otherwise have been idle in the summer time.

Mr. LLOYD: That is a source of profit with which we have nothing to do. It has nothing to do with the manufacture of gas, and we do not think of taking over that.

Witness: Nor would the company be entitled to sell lime. Then there would be the repairs and renewals of retorts, at 1d. additional, £84 1s.; repairs of works and mains, £252 2s. 0d.; office-rent, £20; manager and clerk, £185. £150 is not a salary at which the company can continue to hold their manager. They will have to give him £200.

Mr. BARLOW: I cannot make these figures tally with the account handed in, and I should like to make them do so. Here is office-rent put down at £120; you put it down at £20; and we have it in evidence that the taxes paid were £92 12s.

Witness: £92 and £20 will come to the same thing nearly. I have added nothing for rates and taxes, because they are already deducted. The clerk at the office I put at £78.

Mr. BARLOW: It is put down at £100 in the papers.

The UMPIRE: The clerk is £80 here.

Witness: I put him at £78. Mr. Anderson and I worked together, and we took very much the same figures. Then collector, £72.

The UMPIRE: You have put it down at £55 10s.

Witness: Yes; that is 1½ per cent. upon the rental. That is an estimate based on my experience, which leads me to say that it is the proper expenditure. Directors and auditors, £200.

Mr. BARLOW: Instead of £150.

Witness: Yes. Then I deduct the lime sold, £25; the depreciation and renewal, £126; 250 lamps, lighting, extinguishing, and cleaning, at 11s. each, £127 10s. That is included in the £495 for labour in manufacture and distribution in the original estimate. Then there is the difference in the cost of coal as between 14s 4d., which it was stated to cost Mr. Church into the works, and what it is found to cost—viz., 15s. 8d. per ton—which, upon 2240 tons, is £149 6s. Then there is the interest upon floating capital, £66. There is only 8½ per cent. of unaccounted-for gas allowed, and we know there was something in excess of 16 per cent. when we took possession of the works. I have, therefore, allowed for 230 tons of coals required to bring up the make to 22,200,000 feet, so as to allow for the sale of 18,697,000 feet, which they say they sold. At 15s. 8d., that makes £180 3s. 4d. Then there are the expenses of manufacturing that coal, at 9s. per ton—that is, turning it into gas and purifying it—£103 10s. Then I deduct 1s. per 1000 feet upon the gas supplied to private consumers, £748 17s. 6d., making a total deduction from the net profit of the sum of £2568 15s.

Mr. BARLOW: Mr. Stevenson's estimate is an estimate of what the value of these works would be to the company, and not what they would be to Mr. Burdon. I see there is here 220 tons of cannel to bring the gas up to 14 sperm candles. Mr. Burdon was not bound to bring it up to 14 candles.

Mr. DAVISON: No; 10.

Mr. BARLOW: I do not see, therefore, how you can charge Mr. Burdon with the expense of cannel to bring it up to 14.

Mr. LLOYD: We will discuss that question afterwards. (To witness:) You say that instead of taking the price at 5s. 6d., you take 4s. 6d., which makes a difference of £748 17s. 6d., making your total deductions £2568 13s., leaving £771 15s. 2d. as the proper annual value of the concern.

Witness: Yes. Whichever principle is adopted in capitalizing the profits, this I conceive to be the proper annual amount of them.

Cross-examined by Mr. DAVISON: I am not prepared to state what principle of valuation should be adopted. My own experience would go to show that the proper plan would be to capitalize the net annual profit at 16¾ years purchase, with proper deductions for putting the works into good going order. I always take the structural value into account.

By Mr. BARLOW: If the works are not in good going order, I deduct from the otherwise estimated commercial value of the undertaking a sum necessary to put them so; and if the works are in excess, that would be an addition.

Cross-examination resumed: The net income of an undertaking is its commercial value, after making proper deductions. If the works would produce 30 or 40 per cent. more gas ready to disperse to the public, I should put a higher value on them than if they were just capable of producing the quantity required.

Mr. DAVISON: Well, then, if they are actually producing a net income, what on earth has structural value to do with it?

Witness: A very great deal. Works may be absolutely run to death. I can understand a case in which works may be producing a net income in the last year of their existence, or very nearly the last year, when the structural value would be almost *nil;* so that very large expenditure would have to be made, which ought to be a deduction from the otherwise commercial value of the undertaking. I have constructed gas-works at Halifax, Clayton Allerton and Thorton, and Runcorn, in Cheshire. The latter place is not so large as Weymouth. I have also constructed works at Malton, where the works are as large as those at Weymouth. I consider the 16¾ years purchase should be upon the absolute net income which would be realized by the incoming purchaser; not the actual income obtainable by the person who is to part with the property. An incorporated company would be entitled to 20 years purchase, because such a company has a fixed rate of interest, and is protected by the authority of Parliament, and has an easy remedy for the collection of its debts. I do not know any case where more than 16¾ years purchase have been given. I have been sole valuer on two occasions, but in both cases the parties were without statutory powers. If this had been a statutable company, I do not know whether I should have given them 20 years purchase. I have heard what Mr. Hawksley has said—he has many pet theories. I should treat a company, whether statutable or not, exactly in the same way with respect to directors and auditors. I have been the advocate for the last few years of cheap gas, but not unreasonably so.

Mr. DAVISON: You have put down 9500 cubic feet as the production of a ton of Newcastle coal, and you say that 16 per cent. leakage is beyond that which you have usually given. I believe you have said before that many companies are carried on in the country with a leakage of only 9 per cent.

Witness: Ten per cent. I do not think there are many at 9 per cent. I have done it myself, but not for long together. The leakage in London is due to the great traffic, and ranges from 9 up to 22 per cent.; 16 per cent. is about the average. Weymouth requires a very large expenditure to keep the pipes and mains in good order, in consequence of the ground being saturated with salt water. The services ought to be renewed once in five years, or the unaccounted-for gas will always be very great. The actual leakage was 18 per cent.; but I think if I had the management of the Weymouth Gas-Works, I could put the leakage under 16 per cent. It would take time; it could not be all done at once.

Mr. DAVISON: You have had it before you that in Weymouth the company have put upon themselves a 4s. 6d. price and 14 candles illuminating power, which Mr. Burdon was under no obligation to give?

Witness: I take all the circumstances into account. Mr. Burdon had given notice of his intention to reduce the price of gas, first to 4s. 6d., and then to 4s., if this company were disposed of.

Mr. DAVISON: But then it was not disposed of. Do you say the principle is to take the works at 16¾ years purchase upon what a person is making, or what the person coming in is to make?

Witness: No; I should say you must take it upon the principle of public policy, which would soon regulate the price of gas. I am quite sure the price of gas there ought not to be more than 4s. 6d. I do not know how many years Mr. Burdon has been charging 5s. 6d., but I know he has power to charge that sum. The difference in cost between 12 and 14 candles would be about 1½d. per candle. The cost of producing 1000 feet of the gas I have been speaking about, including coal, would be 3s. 4½d.; excluding coal, it is 1s. 10⅝d. This cost of 1s. 10⅝d. is about 2d. more than at Gravesend, where both the arbitrators were recently engaged in supporting 1s. 8d. as the cost of manufacturing gas.

By Mr. BARLOW: The 3s. 4½d. includes depreciation and interest on floating capital; everything except dividend.

Mr. DAVISON: I am told by Mr. Hawksley that you have made a mistake, and that 50d. is the total cost, according to your estimate?

Witness: No; he has not deducted residuals.

By Mr. PENNY: The residuals come to 9·72d., and if you deduct that you will have about my figure.

Mr. DAVISON: You have just now stated that the cost of increasing the illuminating power from 12 to 14 candles would be 1½d. per candle. That works out at 3d. per 1000 throughout?

Witness: You cannot take it that way. Common Newcastle coal will produce 12 sperm candle gas; then, in order to get it up to 14 candles, you want an expenditure of 3d. in cannel.

Mr. DAVISON: Then why should it be put upon Mr. Burdon, who is only bound to supply 12 candles, which he can produce from Newcastle coal, to pay 6d. more for that which he is not bound to supply?

Witness: I did not say he was bound to produce 14-candle gas. I said that to raise the illuminating power from 12 to 14 candles would cost him 3d. per 1000 feet. He ought to produce his gas at 3d. less than 40·33d.

Cross-examination continued: I think the right way of valuing is to value as against Mr. Burdon for the extra illuminating power which he is not bound to give, and for this reason, that Mr. Burdon could not have continued to supply 12-candle gas at 5s. 6d. The public were dissatisfied, and insisted upon having something better at a lower price. Very likely I said last year that 18-candle gas could be delivered in London for 2s. 10d.; but I forget what the figures were. I have not looked at the evidence since then, but you have the book before you. Whatever I said I am prepared to prove. That was supposing the company supplying gas had the monopoly of supply. I cannot remember whether that included interest to the producer. I do not remember what I put the cannel at. I think I estimated it at 27s., and Newcastle coal at 16s. The reason why with a monopoly at Weymouth I could not produce gas there at less than 40d. is because there is a much larger district to supply gas over, and a very much less consumption per mile of main. The consumption in the City of London sometimes amounts to 8 million cubic feet per day. Probably it would be as cheap to make gas in Weymouth as in London, because they both have seaborne coals, and the wages are about the same; but each case must stand upon its own footing.

By the UMPIRE: The cost of gas per 1000 feet varies in the inverse ratio to the quantity of gas sold.

By Mr. BARLOW: I do not apply that principle to the whole case, but only to a portion. It applies to the cost of distribution, and also to the cost of repairs somewhat. The cost of repairs in some works is greater than in others. In small works it is more than in large works. I do not think there would be any difference in the cost of the retorts. There would be a difference in the services as they are smaller. I do not know the total cost of distribution in London, but I could get it at my office.

By Mr. DAVISON: The cost of distribution in Weymouth is 1·78d. London is more favourably situated for selling gas than Weymouth.

Mr. BARLOW: What Mr. Stevenson means is this, I have no doubt: he can pay his parliamentary dividend at a less rate per 1000 feet in London than in Weymouth; but that is not the matter you are driving at.

Cross-examination resumed: I should say there was very little difference between Weymouth and London as to the cost of gas into the holder. The difference is in maintenance, management, repairs, and supervision; all these items are more in a small town than a large one.

Mr. DAVISON: You have put it in Weymouth at how much?

Witness: A portion of the labour and supervision, 8·81d, belongs to distribution, and includes all the work done both in the works and out of them. I am afraid I cannot analyze that immediately; but the cost per 1000 feet of gas sold, applied, as I prefer to do it, upon the coals carbonized, varies in the ratio of the quantity of gas sold. At Halifax, the expenditure charges are 11s. 2d. per ton on the coal carbonized.

By Mr. BARLOW: That includes all charges except coal. At Gravesend, it is 13s. 4d.; at Weymouth, it is exactly 15s. At Gravesend the make of gas is about double what it is at Weymouth.

Cross-examination resumed: I cannot tell the price per 1000 paid for the public lamps. There are 224 lamps at £2 2s. 6d., and 6 at 48s. That I have taken as a fact. I do not know whether the price will be increased when the present contract is at an end. I do not know whether the 6 lamps at 48s. are extra the contract. I think the price for the public lamps at Weymouth is a low price, but I know some cases in which it is lower.

Mr. DAVISON: You have taken your price from Mr. Crickmay's valuation as to the structural value. I do not know the way in which you invite the arbitrators to arrive at the valuation of these works. Is it upon the structural value? Is that the principle?

Witness: I leave that an open question entirely for the arbitrators. I am not prepared to say what is or what is not the right way. I give you both ways.

Mr. DAVISON: Is it right that Mr. Burdon should have the bricks and mortar valued against him at its depreciated value?

Witness: He would not have just the value of the bricks and mortar; there would be the goodwill, which would have to be assessed by the arbitrators. I have not put that in; it would depend upon whether there was any profit realized to entitle him to it.

Mr. DAVISON; You have made out a profit of £830—should he have nothing for that?

Witness: That depends upon whether the income is more than 5 per cent. upon the value of the property. In so far as it is worth more than 5 per cent. he should receive something for the goodwill. I do not say that £15,026 is the sum Mr. Burdon should have. The materials, tools, and fittings in store I valued at £1555. I went over them item by item. I believe they are the same things upon which £2600 was to be paid by Mr. Burdon, under the award, to Mr. Church. I valued them on two occasions at Weymouth. I do not know how long the company had then been in possession. The first time was in July last year, when I valued everything at the office. I valued the coal as 305 tons, at 15s.; 8d. being taken off for depreciation. The coals were small. The quantity returned to me was 425 tons, but I found there was a large heap of earth in the middle of the coal-store, which took away from the cubical contents, reducing the net quantity to 305 tons. We measured the quantity afterwards, when the store was nearly empty. We could not measure the cubical contents of a building before we got the dimensions. We measured it as full. I do not know that Mr. Spice offered to go over the account at any time within a week with Mr. Penny; but if they had gone over it they would not have seen the great heap in the centre. The earth was there before the coal. I took the price of coal at 15s. because I was told that was the cost delivered into the works. I do not agree with Mr. Spice and Mr. Church that the works are capable of doing more than they are doing.

By the UMPIRE: I do not think it is safe to go through the winter without an additional bench of retorts.

Mr. DAVISON: There was one bed of retorts not in work when we were there.

Witness: I forget what number there were.

Mr. BARLOW: I think Mr. Church told us that in the previous winter there was one bed of retorts to spare.

Mr. DAVISON: Yes; he did.

Examination continued: I put the coke sold at 13s. That is the fact, I believe. The manager gave me that figure. I do not know whether the price of coke is lower than it was last June. Gas coal is dearer now than it was a year ago; coke varies very much in price. Last year it was lower than now, though coal was dearer. Tar I have put at 1d. per gallon. I know they put it at 2½d. and 3d., but they cannot get a farthing for it. I have seen the answers sent to the advertisements. I put it at 1d. because I thought they ought certainly to make that for it, either to sell or burn. They ought to get 1d. by making naphtha or coal pitch. The breeze I took as coke. On the other side of the account I estimate "Labour in manufacture and distribution" at 4s. 6d. per ton of coal. The actual charge is about £393, but in that sum there is no manager charged for.

Mr. DAVISON: Then you have your manager £150, and the secretary and clerk. I suppose Mr. Burdon could do very well with a manager and clerk, without a secretary.

Witness: Mr. Church was his own manager. He would want a clerk at the office. I do not see how the company could carry on their business without a secretary; and they also want directors and auditors. I do not consider the £150 I put down for them as enormous in proportion to the gas sold. I know the Nottingham Gas-Works; but I do not know what the directors there get. Mr. Hawksley is director and everything else there. This £150 is only 2d. per 1000 feet of gas sold. I think there are ten directors at Weymouth.

The UMPIRE: That is not much for each.

Mr. DAVISON: Then I see we have "Law," "Collection," "Bad debts and allowances." I have not much to say about these. Our bad debts are £24. Then "Repairs to works, mains, meters, &c."—that again is an estimate?

Witness: Yes.

Mr. DAVISON: Office-rent is next. Have we not got an office at the works?

Witness: There is a little office, but there is also an office in the town. The books which were burned were kept at the office in town. The book kept at the works was the rough carbonizing book, in which the foreman could keep an account of his proceedings. With ten directors I think there should be an office in the town. "General charges" means postages, books, coals for the office, and everything of that sort.

Mr. DAVISON: Would you mind capitalizing that little sum for directors at 16⅔. It is £2500, is it not?

Witness: I will take your figures, if you say it is so.

Mr. DAVISON: That is to say, Mr. Burdon is to pay £2500 for the benefit of Mr. Thomas and his company. In other words, he is to sell this thing, which was making something for him, and forego £2500 for the sake of a board of directors. Is that your notion of the principle of valuing gas-works? Is that right?

Witness: It would not be right for Mr. Burdon to pay £2500 for directors. He ought to have put himself in the position of a company, when he would have got something more than 16⅔ years.

Mr. DAVISON: The last item is interest upon £1000 for floating capital. Do you think it right that this company—a statutable company, you know, with a statutable dividend and a capital—should take out of Mr. Burdon's pocket the interest upon £1000 of floating capital?

Witness: Yes; they must keep 1000 as their floating capital. It is not a part of their share capital.

Mr. DAVISON: Then pray how are they to get it?

Witness: At certain seasons of the year they will have their coal-stores filled with coals, which are lying there as a dead weight.

Mr. DAVISON: Surely that is an item which might be well charged as between an individual and an individual; but when you have a share capital created under an Act of Parliament you would not put it as against us? How are they to get it?

Witness: It is a statutable deduction, which is always allowed in rating cases, and therefore must be admitted here. That would efficiently work the concern as at present, without looking forward to the time when the manager wants £200 a year. The staff would do for a much larger distribution of gas, and that is one of the items in which a small company suffers. The whole of my estimate is based upon what the company will receive and may be expected to pay. They will have to borrow money, and pay 5 per cent. for it.

Mr. DAVISON: Now, then, you get at a net rental of £855 5s. 3d., and upon that you say we should have 16⅔ years purchase.

Witness: Yes.

Mr. DAVISON: In addition to that probably you would allow us to be paid for our land.

Witness: I have not taken the land into account.

Mr. DAVISON: You would, of course, give us the £1555 for which we have to pay £2600

Witness: Yes; I will show you what I think you are entitled to. [Handing in paper.]

Mr. DAVISON: We certainly should have had this in the examination in chief. This is the very thing. Here is the 16⅔. Let me ask you about the £1304 required to place the works and mains in good going order and condition. These matters were known to you when you went to Weymouth?

Witness: Yes. My evidence was in the hands of Mr. Tissard.

Mr. DAVISON: Then would it not have been fair to ask Mr. Church about the size of this hydraulic, and the £592 for raising the pipeage to an average of 4 inches, so as to increase the capacity to supply more gas?

Witness: The main pipeage is very much less than it should be.

Mr. DAVISON: But if you put down 4-inch pipes, it would enable you to supply with less pressure?

Witness: It would not do that. It would bring up the pipeage to the average of above 4 inches. At present there are 15,572 yards of pipeage altogether, and of that 9000 yards, or nearly two-thirds of the whole, are 2 inch.

By Mr. BARLOW: These are returns to me by the manager, who has measured them.

Cross-examination resumed: Mr. Burdon could not have gone on long with works of the present capacity. I do not think he was working at all economically to use pipes of this diameter.

Mr. BARLOW: Increasing the capacity of the pipes, would enable them to deliver a larger quantity of gas, and, by the pressure being reduced, diminish the leakage.

Witness: Yes.

Mr. BARLOW: There is not a vast difference between you. They have allowed nothing for increase of pipeage. Mr. Stevenson admits that is an extension. Deduct that from the £1304, and it is very little more than Mr. Spice has already allowed.

Mr. DAVISON: It is only £100. It is about £700, in round numbers, as against £600. (To witness:) In No. 2 table I see you have repairs to works, mains, meters, &c., £348 17s. 6d.; addition to your depreciation and renewal, £126. That is an estimate, I suppose?

Witness: Yes: the whole thing is an estimate. It says so at the head of the table—"Estimated income and expenditure." My valuations and Mr. Anderson's were made entirely independent of each other, and his figures do not come quite to mine. I do not know whether the figures are agreed to. He has never seen my figures.

Re-examined by Mr. LLOYD: The principle of capitalizing at 16⅔ of the absolute net profits is in order that the incoming tenant or purchaser may realize 6 per cent.; and unless all the proper deductions are made he will not realize it. 6 per cent. is a very moderate return to get in respect to gas-works, as there are considerable risks. Some gentlemen put a very considerable sum aside for risks and casualties; that is, compensation in case of damage, because it is not a certain profit. It requires great care in the management, and even then it is impossible to avoid the contingencies of the negligence of servants. There are many contingencies which do not come into an estimate of actual expenditure, which, nevertheless, ought to be provided against. I think 5s. 6d. is a very large price for gas. At Plymouth it is 2s. 9d. I consider 4s. 6d. a reasonable outside price which ought to be charged. These works could not have been carried on unless the proprietor consented to a reduction; the public were in arms against him and his lessee. He would not in future have been able to charge more than 4s. 6d. He gave notice to reduce to 4s. The public would also have demanded 14-candle gas. If the illuminating power is not good, that is a reason why competition should spring up. Fourteen candles is the lowest illuminating power, except under very exceptional circumstances, with which a bill will pass through Parliament. Lord Redesdale invariably puts it up to 14 candles. To bring it up to that with Newcastle coal, a portion of cannel must be used. If I said last session that gas could be supplied in the City of London at 2s. 10d., it was given in evidence on behalf of the corporation of London—the corporation using the corporate funds for the construction of the works, and realizing I forget what interest upon their money; that is, by the corporation having the monopoly of supply in the City, and turning out the Great Central, the Chartered, and the City Companies. I do not mean the whole of London; only the City proper.

Mr. DAVISON: I happen to have been there, and I have the book before me, and I assure you it was nothing of the sort. Therefore, perhaps you will not make the witness say so to-day.

Mr. BARLOW: They are the figures at which the corporation could supply gas in competition with the two existing companies.

Witness: I will refer to the Blue-Book, but I am quite sure the question was asked me—"Do you suppose that, if the corporation supplied 18-candle gas at 3s., the other companies could live?" and I said—"No; it would drive them out." Therefore, I contemplated the supply of the City of London proper by the corporation at 3s. for 18-candle gas by the other companies being put on one side altogether.

Mr. DAVISON: Pray do not let Mr. Stevenson be misled. Here is the evidence [quoting from the Blue-Book]—"making the total cost of the gas 33·93, or, say, 2s. 10d. per 1000 feet."

Re-examination resumed: That would be no criterion as to Weymouth. I made an independent calculation, taking the quantity of gas sold, of what the profits should be, which I adhere to. What I did afterwards was simply to ascertain how far that squared with my preconceived idea.

By Mr. BARLOW: I do not consider any allowance for contingencies should be made, for I think that, with due care, there ought not to be the possibility of damage arising. But companies are liable for the acts of their servants, and the most serious risks companies run are due to the negligence of servants. I do not myself ever make any allowance. I charge at Tenby 5s., and at Pembroke and Pembroke Dock 5s. 6d.—the consumption at Tenby being under 2 million feet per annum, and at Pembroke under 5 million. Coal costs me nearly 18s. In the estimate I have handed in I have put down labour in manufacture and distribution, £495; that is upon the basis of 8s. 6d. per ton upon the works, and 1s. in the streets. I have put it down as low as 2s. 9d., in the cases of Huddersfield. I think the wages were lower in those towns then; it was 10 years ago. I should think the make at Huddersfield was 100 millions a year—five times as much as Weymouth. But that does not at all affect the question of labour upon the works in the carbonization of coal. In that case 2s. 9d. per ton was allowed for manufacture and distribution. I have not the least idea what was allowed for wear and tear of retorts, machinery, &c. I should not be surprised to be told it was 1s. per ton. It was very likely

done on Mr. Barlow's suggestion, though no doubt with my consent. Mr. Barlow's experience was much greater than mine.

Mr. BARLOW: I see you have in the Weymouth estimate for repairs of works and mains, £348, which is about 3s. per ton. Upon the same basis as the Huddersfield it would be £110. Do you think 3s. at Weymouth, as compared with 1s. 2d. at Huddersfield, fair and proper?

Witness: I do not know anything about the Huddersfield figures. I am quite sure they are worthless. My own experience is much greater now than it was then, and I should like to eat every one of those figures rather than be sworn to them. I do not want to hear of that Huddersfield valuation again, for I candidly say it was made when I had comparatively little experience of the cost of gas-works.

Mr. BARLOW: You were then valuing for the town commissioners, who were proposing to purchase the works?

Witness: Yes, from a company without statutory powers.

The UMPIRE: He lays the onus of everything upon Mr. Barlow.

Witness: There are some of the figures as much too high as others are too low.

Mr. LLOYD: Mr. Barlow would not like to be bound by them now, I dare say.

Mr. BARLOW: You recollect writing to the commissioners to this effect: "Gentlemen,—I have, together with Mr. T. G. Barlow, made a survey and valuation of the works and undertaking, and have examined the accounts of the Huddersfield Gas Company, and I now beg to recommend that your board should accept the offer which has been made by the company to sell their works to you for the sum of £63,000. From the very careful calculations we have made we feel perfectly satisfied that the undertaking will yield immediately a net profit of 7½ per cent. per annum upon the purchase-money, together with such further sum as may be required to carry on the works"?

Witness: Yes; it would have yielded more than 7½ per cent. Our valuation, I think, amounted to something over £80,000.

Mr. BARLOW: Was it not nearer £90,000?

Witness: The commissioners did accept the offer of the company to transfer their works for £63,000, and then an agitation was got up in the town, and the bargain went off.

Mr. CLERK: Was there a Flintoff there?

Witness: No; a man not so wise in his generation. The whole thing was put aside, and the commercial value of the works is now nearly double.

By Mr. BARLOW: The manager was awfully underpaid—something like £180 was what he was actually getting; the book-keeper, £80; collector, £80; inspectors, £200. There was no allowance to directors.

The UMPIRE: They ought to have been paid.

Mr. DAVISON: We say not. They had no statutory powers, and they were in exactly the same position as Mr. Burdon.

The UMPIRE: Nevertheless, as an outlay, it was a deduction of so much from the gross profits.

Mr. DAVISON: They had no business to lay out money to charge other people with it. They might as well appoint Mr. Lloyd as standing counsel, at £1000 a year.

Mr. BARLOW: Mr. Stevenson tells us that the total salaries which make up £540 a year in a concern which he admits was making five times the quantity of gas that Weymouth——

Witness: I see I was wrong; it is four times.

Mr. BARLOW: Then I want you to explain that; as against allowances you have made here they come to £535.

Witness: I can only explain it by saying I have now had much more experience in the cost of managing gas-works than I had then. I see there was a deduction of £2000 from the estimated commercial value for getting the Act of Parliament. I have made no such reduction in my estimate.

Mr. PENNY: I find the sum you were prepared to recommend the Huddersfield Commissioners to give was £63,000.

Mr. BARLOW: £89,000.

Mr. PENNY: But you recommended the commissioners to accept the offer made by the company?

Witness: Yes.

By Mr. BARLOW: Before the valuation was made nothing was said about the offer of the company, but as soon as the valuation had been given in and examined, the committee of the commissioners informed the valuers that the works might be bought for £63,000, on which the valuers said, "Don't ask us another question, but go and sign the agreement; you can't do better." A very important point was concealed from us—I think it was unintentional—and that was that the price of gas was to be reduced 6d. per 1000 feet immediately. The company had given notice to that effect. The estimate of £89,000 was made upon the higher price. The price of coal was 7s., I think.

Mr. PENNY: What would be the value of the Weymouth works, taken at the same rates? Divide 63 by 4. That would give about £15,000, would it not? It is really for the umpire to consider this question in all its bearings.

Witness: It is better to take the tonnage of coal. It is short of £16,000, as applied to Weymouth. As soon as it came to my knowledge that the Huddersfield Company had given notice to reduce the price 6d. per 1000, I wrote an independent letter to the commissioners, altering my commercial value of the works, and putting it below £63,000. It cannot be a fact that there was only 8½ per cent. of leakage at Weymouth; they have taken an estimated consumption for the public lamps, and do not give that quantity. There is no other explanation.

By Mr. DAVISON: The leakage in the summer quarter is always in excess of the winter. It will be proved that the leakage in the half year during which the company have been working is over 15 per cent., after the company have taken up a whole street full of rotten services—the principal street in the town. When I took possession of the Huddersfield works the leakage was more than 25 per cent.

By Mr. BARLOW: I reduced it to 9 per cent. for a short time, but it got up again gradually.

G. Anderson, Esq., examined by Mr. LLOYD.

I am a gas engineer, and have been well acquainted with the practical working and manufacture of gas for many years. I have seven gas-works on lease, which I carry on either by myself or with partners—Dover, with a manufacture of about 80 millions; Aldershot, 10 to 12 millions; Netley, 7 to 8 millions; Waterford, about 26 millions; and three others in Ireland, with an average manufacture of about 10 millions for the three. Until October last I leased the Canterbury works with a partner, where the manufacture was over 40 millions. I think the Weymouth works, like most old gas-works in the country, are not on a good system. They are on the system on which works were constructed when the price was 6s., 7s., or 8s. er 10 00. A small alteratfon has taken place, by the introduction of clay eto rts and an exhauster; but, beside that, the works are old, and require considerable alteration to modify them, and adapt them to modern principles of manufacture. The price of gas is now, I think, as low as it can be for some time to come. The price at which gas can be sold depends upon the quantity made rather than upon the first cost of materials. In other words, if two companies pay the same price for materials and labour, one company will make 10 per cent. at 4s., while another will not make 6 per cent. at 7s. The amount of supply is the main question. I should call these small works. I have made an estimate of the cost of working a concern manufacturing 22 million feet of gas per annum, which is pretty much the same as Weymouth. I have based the cost, where I could get the fact, upon the state of things existing at Weymouth; and, where the circumstances do not give any facts—inasmuch as a very small proportion of the expense of making gas there was borne by the lessee—I have substituted such facts as my experience dictated. I take the price of coal at 14s. 4d., which I was told was the proper price; but I am now informed it is too low by about 1s. 6d. per ton, so that must be borne in mind in carrying out my figures. I take 9400 feet to the ton, which is as much as I believe can be got if you manufacture gas of a propor illuminating power. I believe that the gas is expected to be of 14-candle illuminating power, and therefore I have included 117 tons of cannel coal. I take 2200 tons of Newcastle.

By Mr. BARLOW: That is 5 per cent. I do not think 10 per cent. is necessary. I may state that the extra cost of manufacturing the gas by thus introducing cannel is not 2d. or 3d., as talked of to-day, but only 68 decimals of a penny. Labour is the next item; I put that at 4½d. per 1000 (which is as low as I could put it for works of that size), which works out to £412 10s.: wear and tear of retorts, 1½d. per 1000 feet, £137 10s.; materials for purification, ¾d. per 1000, £68 15s.; wear and tear of works, mains, and services—every repair, in fact, unless it is retort repairs—2d. per 1000, £183 6s. 8d. At the time I made out this estimate I did not know whether or not meters were charged for; I neither put them on one side or the other. It is generally supposed that if we take the rental for meters we take that rental with the profits. I then take lighting, cleaning, and extinguishing the lamps, at 12s., which is £153 12s.; secretary and manager, £175; and directors and their expenses, £175. I require a clerk at £100; a collector at £70; a young man to attend to the works when the manager is away, and I give him £25; then bad debts and allowances, £30; rates and taxes I estimate at £90; but I find they are more. I put down law at only £15; and auditors at £20. Stationery, postages, and other incidentals I put at £45. Then, beyond the annual repairs of works, they wear out, and require to be renewed. I put that at 1½ per cent. upon £12,000, which is £180. I have then a net balance remaining of so much. On the other side I reckon that these works will lose about 20 per cent. of the gas they make. I do so, because I made the experiments on a quiet day when there was no consumption in the town so far as I knew. I ascertained the descent of the gasholder over a given time, and that by calculation gave 24 per cent. of leakage per annum. That was on the 13th of July. I therefore can sell 13,299,000 feet of gas to the consumers. I require 4,257,000 feet for the street-lamps, and the balance is my leakage—viz., 4,398,000 cubic feet. I receive for this from the private consumers, at 4s. 6d. per 1000, £2992 5s.; and for the street-lamps, £532 18s. I assume that I must sell some old materials, and I credit £25 for that. I estimate to sell 933 tons of coke at 15s. per ton; and I should like to state here in passing that I understand since I made out this paper that the price of coke is only 14s. per ton, and not 15s. That is £699 15s. Then I get for sale 50 tons of cannel coke, which I put at 10s., because it is of inferior quality. That makes £25; and I sell 176 chaldrons of breeze at 2s. 6d., £22; and 23,400 gallons of tar at 1d. which is £97. The total is £4394 10s. 6d.; the income being £764 6s. 10d. over the expenditure. But I have a remark at the bottom of this paper. "From two experiments of the quantity of gas sent out during daylight, the leakage and condensation were estimated at 24 per cent. Above it has been estimated at 20 per cent. only; but if the mains and services were put into proper condition, 16 per cent. would be enough, and the above balance would be increased to £899 1s. 10d." On the last occasion we had placed before us the amount of profit per annum, amounting to £3000 odd. That large profit was arrived at because a great many expenses necessary for the manufacture of gas seem not to have been included in the existing terms between the lessee and the then proprietor. I have since examined a book called a cash-book, but it is really an account-book. This book only came down to the year 1863; however, it proved the fact that the expenses I know I suffer as a lessee were in that book chargeable against Mr. Burdon. For instance, if a main was broken and required repair, an account was made out, and the expense charged to Mr. Burdon. If a main was lifted in the street, and a larger one put down in its place, the extra cost was charged to Mr. Burdon. Therefore, as the entire cost of making gas could not be ascertained from the papers put before us at Weymouth, I have added the omissions I considered necessary. The total expenditure would be roughly £1700, but not exactly. It consists first of materials for purification. According to figures placed before us at Weymouth, there was nothing charged for purification. There was credit taken for lime sold, but no item put down for limestone bought. Therefore, I have added for that omission ¾d. per 1000 feet, £68 1s. 6d. The repairs to retorts put before us at Weymouth consisted of the repairs of seven retorts. Now I know that that is erroneous; I could use stronger terms. I am quite sure some items of expense have been omitted. I have to add then for that 1d. per 1000. At Weymouth, in the papers handed in, it amounted to £41 7s. 6d. for repairs of retorts. Now, there are 33 to 35 on the works, and they all require more or less repair every year; therefore, by some circumstance or other, the whole repair of the retorts, except these seven, has been lost. I therefore add 1d. for that, which is an increase of £84 1s.

Mr. BARLOW: How many retorts would that £84 represent?

Witness: I have not estimated it in the mode in which you put the question. I have estimated it in the mode in which it is generally done by my profession, which is, that it takes so much per 1000 feet for repairs, and I have added any deficiency which I have found above the amount necessary to represent the amount paid for repairs.

By Mr. LLOYD: I do not assume any particular number of retorts. I say that Mr. Church has not correctly stated what the repairs were.

Mr. BARLOW: Mr. Church says there was such a cost as represented £40 odd, which is about £6 per retort. Then £84 would represent 14 retorts, which would make 21 retorts worn out and replaced per annum out of the 35.

Witness: Mr. Barlow has arrived at a conclusion which he has no premises to justify. Mr. Church charged £41 3s. 6d. for certain repairs done to the retorts, but Mr. Church did not finish those repairs; he left them in an unfinished state, and the company have finished them.

Mr. BARLOW: That was not Mr. Church's evidence.

Witness: It matters not to me what the evidence was. I go by my own sight; I saw the retorts after Mr. Church left.

Mr. BARLOW: What would your estimate be of the cost per retort? Mr. Church's figures are based upon £6 per retort—what should you say?

Witness: It would take from £6 to £8, according to their condition; but that is not the way in which it is done. My figures have no reference to any particular number of retorts, but are the result of the very long experience I have had as to what it takes to repair retorts. In one year we may have no repairs compared with what we have in another. It requires 1½d. per 1000 feet; therefore I add £84 1s. I find the repairs to the works and mains are not charged in these figures according to what they cost me in my works by a sum of 3d. per 1000, or £252 3s. These repairs include roofs, walls, pavements, sewers, drains, pipes, services, &c. Then the other side shows lime sold £25, but nothing put down for limestone bought, and I have simply taken credit for £25.

Mr. BARLOW: In page 3 of one of those books, I see the cost of lime is put down at £47 5s.

Witness: I see perfectly well how it is. It appears that they have paid so much for limestone, and have sold a quantity of lime, which is, I suppose, what they have paid for limestone: therefore they credit themselves so much as lime manufacturers.

Mr. CLERK: It was explained the first day by Mr. Church.

Witness: If you take anything for that I should require to add something more to my item of labour, because it must take labour, and I have only put down that which is necessary to make gas. I then ask £200 for a manager and a clerk; you may divide that sum as you like.

Mr. LLOYD: This is in addition to what they have got?

Witness: They have got nothing. The clerk worked for his own amusement.

Mr. DAVISON objected to the witness commenting upon the evidence in that way.

By Mr. BARLOW: I want a rental-clerk to make out the books at £104, and a collector at £96 13s.; that makes £200 13s. These are the expenses which it appears on the evidence given at Weymouth were borne outside of Mr. Church, for it seems that Mr. Burdon, by his arrangement, collected the rentals himself. Then, I ask for directors and auditors £150. Then I want a renewal-fund, to keep the works in proper order, they being at the present time in inferior order, and I put that at 2 per cent. upon the capital of £13,000, or £260. I then want for lighting and extinguishing the lamps, in addition to £23 put down, £137 10s.

Mr. BARLOW: But do you not know that, in Mr. Church's figures, there is a sum of £166 8s. 7d. allowed as the cost of lighting, cleaning, and repairing the public lamps? It is included in an item of £399 9s. 11d., in Mr. Church's evidence. How much, in addition to that £166, do you add?

Witness: I have had no figures before me of £166 being applied for the lighting, &c.

By the UMPIRE: If you put £100 for lamplighters, and take it out of any sum you have here for wages, I shall have to add that to my wages, for I have already taken the wages which I consider necessary for the manufacture of gas. It alters the language, but not the total. Then I require 224 tons of coal more than is stated to manufacture the quantity of gas necessary to earn that rental. In other words, I have no faith whatever in 8, 9, or 10 per cent. leakages. I have been engaged with gas-works all my life, and I have no hesitation in saying that no competent authority will state such a thing. At one work I have, I measure the gas at the station-meter, and also as it is distributed to the consumer, and the difference between the two measurements is from 4 to 5 per cent. It is a peculiar case; there is, perhaps, not another case like it in England. It is a philosophical fact. You measure the gas at the works at 60° or 70° temperature, and you measure it at the consumers meters at the temperature of the earth. There is a difference of volume, and, due to that, there is an absolute loss of from 4 to 5 per cent.

Mr. LLOYD: Quite irrespective of any leakage.

Witness: The gas goes in hotter to the station-meter than it comes out at the consumers meter. In a hard frost, when three-fourths of the gas is used, and the consumer gets his gas at 32° or 28°, that gas has been measured at the station-meter at perhaps 60° or 65°; and for every 5° of temperature there is about 1 per cent. difference of volume, so that actually there is a loss of 4 per cent. Then they have to deliver gas over miles of mains and leaky services, and I think it is wrong for any one to suppose that the actual loss is only 10 per cent. The true loss is 16 or 17 per cent.

By Mr. BARLOW: It used to be 11 per cent. at Dover, but it is now something like 15, since we have extended the mains into the various parts. Dover is capitally situated for the distribution of gas with a small leakage, as much gas being supplied to one consumer as the Weymouth works supply to the whole town. Nine-tenths of all the gas in Dover is supplied within 30 feet of the same level. There may be one or two places where it is not so, but it is a very small matter, and I have no hesitation in saying that the pressure is very uniform. Here I take £149 6s. 8d. for the additional coal to earn the rental I have on the other side; and also a capital to carry on the concern, which I put at £1100, and I ask 6 per cent., which amounts to £66. That is in addition to the £900 allowed in Mr. Church's figures. According to my valuation of the present stock, taken in the summer time, I want £1500 for stock. That is the time when there is little coal on the works. In addition to that I want book debts; there are no book debts valued to us. We must sometimes have the public lights three months in arrear. That is about £500; and we must have some four months of the private rental. I think £2000 is little enough for floating capital in a concern of this kind. Applying these additions to Mr. Church's statement, reduces his balance from £3000 odd to £761 16s. 2d.

By Mr. LLOYD: Wear and tear of retorts, generally, is put down at 2·44d. per 1000 feet, but that is not in accordance with my experience. At Dover I find it is 3¾d., and at Waterford 5¼d. I am quite sure that 2·44d. for Weymouth cannot be correct. I consider that to take the expenses for repairs of a gas-work for one year will give us a very inadequate idea of what those repairs would be. It appears from the papers before us that there was no expense for repairs charged, except for repairs to one bed of retorts, which were done in the month of March last; consequently all the repairs which every company is obliged to make during the beginning of winter have been, by some means, omitted. The average life of a retort is from a year and a half to two years, but they require repair every year. The repairs are usually commenced as soon as the winter season slacks off a little. They are going on all the summer, and by the month of October the gas-works are ready for the winter. But all the repairs they say were done were done in March last. There seems to have been a breakdown through the winter, so that they had the bricklayers and stokers working together, at great disadvantage, in order to make the place safe, so as to continue the supply at all. The repairs to the works were charged to Mr. Burdon, and I believe it is in consequence of that fact that he has such an extravagant notion of their value.

By Mr. BARLOW: It would require something like £1100 to bring the works up to a working condition to earn the rental. This £1100 includes some enlargements of the mains, as well as the substitution of pipes for the present service-pipes.

By Mr. LLOYD: The items are pretty much the same as those Mr. Stevenson has given, but I do not know that the amount is the same. For instance, the retorts were considered out of order, and they were old-fashioned, and required to some extent to be remodelled; that may be done when they are renewed. They require larger pipes to take away the gas made. The purifiers are absolutely done for; they are all in holes, and they have had to be repaired since the company took possession. They were old when they were put in, which is not an unusual thing. Then there is an old gasholder there which encumbers the tank, and which I consider is dangerous, inasmuch as there is a tank 16 or 18 feet deep full of tar and other abominable stuff, into which any one might tumble. I think the holder should be removed, and the tank covered over and made proper for the purpose. Then the governor-pipe is not large enough, and there ought to be some provision to pass the different apparatus in case of accident. Cast-iron pipes should also be put down instead of wrought iron. The service-pipes taken up were in a very bad condition. This expenditure must be immediately incurred, whoever has the works.

Mr. LLOYD: And at whatever sum we capitalize the profits, so as to get at the value of the works, there will have to be deducted from that the amount necessary to put the works into a sufficiently good order to produce the income?

Witness: I think so, and I have put it down at £1146. I have had an opportunity of looking at the book which was produced by Mr. Waters, and the impression on my mind on looking over it was that it was made out subsequent to the arrangement between Mr. Burdon and Mr. Church. I find an entry here in this phraseology. First, there are the receipts brought down, and then it says—"Leaving in stock what was afterwards sold." Now I contend that any one who speaks of the future before that arrives, speaks in ignorance of what that future may be.

Cross-examined by Mr. CLERK: I have looked at the value of this concern in two ways—one is the constructive value, and the other the commercial value. Taking the commercial value, I suppose that the works have been put into proper order to earn the large balance of £899, and then I have taken that at 16⅔ years purchase, which seems to be the mode which is usually adopted; I do not know whether it is right or not. That makes £14,983; but inasmuch as by the statement I have read it will require £1146 to put the works in a condition to earn this rental, I have to deduct that, and therefore the real value is £13,837 at the present moment. That has nothing to do with stock, which I take afterwards. The stock I put at £1544.

Mr. CLERK: And what do you put for the land?

Mr. LLOYD: You mean the land not employed for the works.

Witness: I did not know there was any surplus.

Cross-examination continued: I understand the people complain of a want of light, and I want to give them the means of obtaining it; and from my experience 3 inches is not a proper size for the mains. The cost of increasing them to 4 inches would be £600. According to my calculation 2s. 6d. would be a fair cost at which gas could be made at Weymouth.

By Mr. BARLOW: That is measured at the consumers meter, because there is all the leakage between the one and the other.

Cross-examination resumed: I have found in general that towns situated like Weymouth ought to be able to make gas at 2s. 6d. I think it is 2s. 6d. at Dover. That is lower than it has been.

Mr. CLERK: As I understand, if you were the lessee of these works, and were carrying them on, with the judgment and experience you have you could make gas at 2s. 6d.?

Witness: Perhaps I should refer to figures, lest I get into a mistake. [Referring to a paper.]

Mr. CLERK: The question is at what price you could manufacture gas at Weymouth for sale.

Witness: In the precise mode in which you have put the question I have not made the calculation, but I find the cost of gas into the holder is 39·6d.; but then we have coke for sale, which amounts to 9·3d.; therefore the cost of the gas is 30·3d. If I take the leakage at one-sixth, which would be 5d., that would make 35d. at the consumer's meter.

Mr. LLOYD: I do not know whether there is any expense of distribution in that.

Mr. CLERK: No; that is the quantity which is lost before it gets to the consumer's meter. (To witness:) You assume that there is one-sixth loss before it gets there.

Witness: Yes. The cost is, therefore, 2s. 11d., and everything between that price and the price at which gas is sold is profit. The case I referred to in which there was 4 or 5 per cent. leakage between the manufacture and distribution was in the camp at Aldershot. I think the lowest per centage of leakage we have had at Dover was 12 per cent. Our price at Dover is about 4s. 2d.; we have a higher price, but we have discounts.

Mr. BARLOW: Do you get 4s. 2d. for the public lights?

Witness: Nearly. I think we have had an increased price since you were there.

Cross-examination resumed: In bringing out this sum of 2s. 11·3d., I have taken into consideration all the expenditure of making gas; I do not think I have excluded anything.

By Mr. BARLOW: The produce of a retort depends very much upon the management, and also upon having an exhauster, which I understand they did not have at Weymouth till the other day.

By Mr. CLERK: Each retort will make about 2 million feet in its lifetime.

Mr. CLERK: Well, 20 millions is our annual make.

Mr. BARLOW: That is 10 retorts per annum. Mr. Anderson says £7 10s. per retort, which is £75.

Mr. CLERK: I make it £120.

Mr. BARLOW: The £120 is an addition to the other.

Mr. LLOYD: There is nothing put down for renewal here?

Mr. CLERK: Yes; £41.

Witness: In addition to that there is the annual repair, as furnaces wear out, and the lids and screws, and the ash-pans, and things of that sort get worn out, which are all in addition to the life of a retort, and which make up the sum I have given as 1½d. per 1000 feet; that is the only way of looking at it.

Mr. CLERK: Then taking it as we have calculated, and taking a price of £7 10s. per retort, it would take £75 for repairs?

Witness: That may be, but you must add the annual repair of the furnaces, which is about one-third of the whole.

Mr. PENNY: Tell us whether it is 10 or 14 retorts to be renewed, because that disturbs the calculation.

Witness: I say 10 is not enough. I do not care what the London gentle-

men say. I say it would take 14, but I would rather take the figure I have given—1½d. per 1000 feet.

Cross-examination resumed: All my calculations are based upon 14-candle gas and 16 per cent. leakage. It seems from the books there were many payments made by Mr. Burdon which were properly chargeable against the profits of the concern, and were not paid by Mr. Church. That was in 1863. I did not know that this matter was fully gone into between Mr. Burdon and Mr. Church by Mr. Spice last summer.

Mr. CLERK: With regard to lime, did you not hear it explained that what you put down here as an item of expense for purification was no cost at all, but that there was a profit on the burning of the lime?

Witness: Yes; I heard it stated.

Mr. CLERK: Why should not the same thing be done by these gentlemen?

Witness: Why, I do not know. In the first place they have no business to be manufacturers of anything but gas, and it would be outside their powers to make lime. There is another reason; I question very much about their having so much profit in a small concern, where they have the kiln only burning for a short time. I am aware that the kiln was part of the property taken over, and that a man was at work there at weekly wages who would not be wanted if the kiln were not there. The words "dealing in lime" in the Act might mean the residual lime which every company sells.

Cross-examination continued: I still say that a floating capital of £2000 is not too much under the circumstances of the case. I could make 12-candle gas from these works to deliver to the consumers at somewhere about 2s. 10d. or 3s.

Mr. CLERK: What do you mean? You have told us 14-candle gas is to be made and delivered at 2s. 11d.

Witness: It is a very important question, and I have worked it out this morning. I find the difference between supplying some cannel coal, which we do and you did not, only makes a difference of ·68d. per 1000 in the cost of gas. In other words, I use 176 tons of cannel, for which I pay 10s. 8d. increased price than for common coal. That 10s. 8d. spread over the entire quantity made is equal to ·68d. per 1000 ft. You would certainly not increase the value of the coke by adding 5 per cent. cannel, but you would not diminish it; it would be all burned in the furnaces. It would be the same to the public. You would not get much out of it by manufacturing gas at Weymouth at 2s. 9d. per 1000.

Mr. CLERK: Then you, perhaps, would not agree with Mr. Stevenson, that the corporation of London could manufacture gas at 2s. 6d., of 18-candle illuminating power?

Witness: That is a very different case; but as you have asked me that question, I may answer it by my experience of what I know has taken place. I know that in the town of Portsmouth the lessee had half of 5s. 6d. for manufacturing the gas, and that was in a place with a consumption of from 80 to 100 millions per annum, and he got his profit out of the 2s. 9d. I do not know whether he was content, but he did it for three years. I never manufactured gas at Woolwich. I think our price at Dover at the present time is about 2s. 10d., and the illuminating power generally about 13 candles, although we are only required to give 12. Dover is a very compact town, and is so from physical causes. You have nothing but high cliffs all round. Dover has been recovered from the sea, and they have piled the houses up as high as they can. The streets are only broad enough to let two carts pass.

Re-examined by Mr. LLOYD: I could manufacture the gas into the station-meter at Weymouth for 2s. 6d. per 1000, but at the consumer's meter it would be 3s. 2d., the difference being the leakage.

Mr. BARLOW: How do you account for the difference between that and the 2s. 11d. you have stated?

Witness: Because in this there are the directors, which, as a lessee, I should not have to pay, and there is a secretary.

Mr. LLOYD: You were going to say you looked at this matter in two ways. What was the other way?

Witness: I have looked at its commercial value, and then I have also taken the constructive value. I make the present structural value £14,718. That includes nothing for goodwill.

Mr. BARLOW: Then, in fact, you make the structural value greater than the commercial value?

Mr. DAVISON: I thought that had been given up. This has not been cross-examined upon; therefore why should you rip it up for re-examination?

Mr. LLOYD: Simply because he said he had taken two views. The one he gave, and you stopped him when he was giving the other.

Mr. DAVISON: At any rate, it is not any reason for raising the question now. (To witness:) There is one thing we want to ask you about, and that is as to the ·68d. for increasing the illuminating power. We have had it worked out, and it turns out to be 2d.

Mr. CLERK: It is rather a complicated matter. We will first take coal. 95 per cent. of the coal used will be common Newcastle, and 5 per cent. cannel. Now, taking the Newcastle coal at 15s. and the cannel at 25s., that would make the average 15s. 6d., being an addition of 6d. per ton, to be divided over the 9500 feet of gas made from the mixture, which is equal to ·63d. per 1000.

Witness: That is what I said.

Mr. CLERK: Now the increase of the illuminating power is ·62 per cent.

Witness: I understand it perfectly. It is exactly as I said. You make it rather less than I did. According to your statement it gives you ·63 per 1000 feet. I have given you nothing of illuminating power; that may be a matter of opinion.

Mr. DAVISON: Will 5 per cent. of cannel instead of Newcastle increase the illuminating power more than ·62 per cent.?

Witness: It will increase it one candle—perhaps a little more. I do not speak from laboratory experiments, but from having to make gas in large quantities; and I know what quantity to put in to make gas of a certain illuminating power. At Canterbury we had to employ from 6 to 8 per cent. of cannel to give us about 2 candles more illuminating power.

Mr. CLERK: The question was, what is the cost of raising 12-candle gas to 14, and your answer was ·68d.?

Witness: That is not the correct way, as I put it. What I said was, our predecessors made gas from Newcastle coal, and we make it from Newcastle and cannel; and the cannel which we use increases the cost by ·68d.

Mr. CLERK: Per 1000 feet for each candle?

Witness: I mean for the extra illuminating power required. I have not said the increase would be ·68d. per candle, but to make 14-candle gas you would require 5 per cent. of cannel. Very likely your gas was more than 12 candles. You will make 12 to 13 candle gas with Newcastle coal, and 5 per cent. of cannel will bring it up to 14.

FRIDAY, JAN. 17.

Mr. *Thomas Stone*, examined by Mr. LLOYD.

I am the present manager of the Weymouth Gas-Works, having had the management of them since the transfer to the company in June last. At that time the plant was in a very bad condition; the majority of the retorts particularly so. The covers of the purifiers were also much worn, and since then they have been largely patched with iron plates, and one has been entirely thrown out of use. The purifier sieves were in a wretched condition; in fact, there was no single tier in all the arrangement that could be properly adapted. The service-pipes which were taken up were in a very bad condition, and some of the mains were broken and had to be repaired. There were splits and fractures in them. All the ascending pipes from the retort-house were too small, and this caused a great amount of trouble and waste of gas. The majority of them were only 3 inches in diameter, and we were stopped frequently because the pipes were choked. A great deal has been done to improve the condition of the plant generally, and much more is required. The unaccounted-for gas, during the first quarter after I entered on the works, was 18 per cent; in the second quarter, by alterations, amendments, and repairs, we reduced the leakage to 11½ per cent.

Mr. LLOYD said they estimated the average at 15·2.

Mr. CLERK added that Mr. Stevenson said it was 16.

Witness: I have taken the actual income and expenditure for the six months at the end of last year. The income from the private consumers was £1896 8s. 10d., and for the public lamps £266 9s. 0d.; the coke sold was £312 6s. 1d.; breeze, £17 8s. 4d.; tar, £22 15s. 3d., and sundries, 6s.—making a total income of £2515 for the half year.

Mr. DAVISON did not know how far they were to be bound by the management of this gentleman. Did the umpire think it was evidence on the point? It was the six months return as they had worked it.

Mr. LLOYD said it must be understood that the price of gas was 4s. 6d. at the time.

The UMPIRE overruled the objection.

Witness: I now come to the deductions and items of expenditure. The first will be 1358 tons of coal and cannel, amounting to £1080 14s. 4d.; labour in manufacture and distribution, amounting to £318 14s.; lime for purification, £30 5s. 10d.; salaries—manager, £75; secretary, £50; clerk, £40; directors and auditors, £50; collection, £84 10s. 0d., being 1½ per cent. upon the rental; rates and taxes, £46; bad debts and general allowances to consumers for overcharges, mistakes, and such like, £23; rent of offices, £10; stationery—account-books, printing, &c., £44 7s. 1d.

Mr. BARLOW observed that some of those were account-books incident to the formation of the company.

Witness: Repairs to works, mains, services, meters, and lamps, £207 10s. This was on an estimate of 4d. per 1000 feet made—it was general annual repairs to keep up the works.

Mr. BARLOW asked for the actual expenditure.

Mr. LLOYD said that the actual expenditure included new meters, which they could not take in because they belonged to capital. The item included a good deal more, this was an estimate of what the annual charge to revenue should be.

Witness: Some of the charges would be to capital account and some to revenue, therefore we have taken an estimate which is much less than the actual expenditure. Then there were sundries, £12 16s. 5d.; a renewal-fund, £63, on the principle of 1 per cent. compound interest for the year. The interest on floating capital has been taken at £25 for the half year. The £63 was upon a capital of £12,600. These details make up a total of £2110 17s. 8d., and this, deducted from our gross income, leaves a balance for the half year of £404 15s. 10d. The average yield of gas per ton of coal is 9160 feet. I keep the carbonizing-book myself.

Mr. LLOYD said that the account showed 9004 feet, so that there was no waste in the production.

Witness (in reply to Mr. BARLOW): We have used the exhauster during a greater portion of the last six months. In the consumers meter account, as it was handed over, we found a large number of errors, which I could not explain, and which I have not seen satisfactorily accounted for yet.

Mr. BARLOW said that the witness should refer to the meter account since the 29th of June. Anything with reference to the previous period did not form the subject of the inquiry.

Mr. LLOYD said they had had an account given to them of the meter registers, which the witness said was incorrect, and in a confused state.

Witness: It is a statement of the meters for the 29th of June. We had to base our first quarter upon that, and a great number of the meters did not stand in September even at what they were taken at in June. A meter might have been entered at 10,000 in June, and in September it did not stand at more than 9000. I do not know whether it had gone back, but I mean to say that it had been over-taken in the former quarter. I never found that the exhauster worked well. I think the cams do not fit. It constantly required to be lubricated, and even now, after constant lubrication for two months, you cannot leave it for ten minutes. It will have to be remedied. It is so much out of order that the contractor who erected it has represented the thing to the patentee and manufacturer in such a way that he has agreed to substitute a new one without charge.

Cross-examined by Mr. DAVISON: I shall have been manager six months in May. Before I entered on these works I was at Sudbury a year and a half, and before that I was the manager of the gas-works at Thornton. My salary at Sudbury was £120 per annum, and 5 per cent. upon the increase in the gas-rental, as well as house-rent and firing. I have nothing upon the increase where I am now. Our make of gas at Sudbury was about 10 million feet. There was a company there, but the works were leased. We have not had the exhauster at work during the whole time I have been at Weymouth. We began to work it about a month after I undertook the management. It was stopped on one or two occasions. A proper exhauster is a great advantage to a gas-work.

Mr. DAVISON: What did you get out of the coal at Sudbury?

Witness: We had not a station-meter there.

Mr. DAVISON: But you know all are agreed that from 9400 to 9500 is what you can get out of a ton of Newcastle coal.

Witness: No; I apprehend that would be with cannel.

Mr. DAVISON: That is your opinion. Did you use cannel at Sudbury?

Witness: No. We did not use cannel all the last six months, but when we did we used 10 per cent. We had cannel the second quarter I was there; none the first. We had not a photometer suitable for testing the illuminating power of our gas. I cannot tell you what it was.

Mr. BARLOW: Have you no photometer?

Witness: There is a photometer, but I cannot estimate the illuminating power by it. I do not think it is a proper instrument.

Mr. LLOYD: It was handed over to you?

Witness: Yes.

Mr. DAVISON: Why is it not a proper instrument?

Witness: That I cannot tell. We have been making gas as good as we could, and at the rate of 9160 feet per ton, including cannel; the price being 4s. 6d. The rental for the first quarter (September) was £542 12s. 4d., and for the other £1353 16s. 6d.; making together £1896 8s. 10d.

Mr. BARLOW: To each of these you add the public lamps.

Mr. DAVISON: Can you tell me the total quantity of gas made in a day, upon an average.

Witness: The quantity varies throughout the half year. I have not got the average. The maximum for any week would be 108,900 cubic feet. This is not during the winter quarter, but is the highest average for any week.

Mr. PENNY: You mean that you made seven times 108,900 feet in one week?

Witness: Yes.

Mr. DAVISON: How many retorts have you?

Witness: Thirty-five; the same now that we had when I went there. They were not going during the whole of the winter. For one month we had the whole of them going. We have five beds of retorts—viz., one of nine, three of seven, and one of five. The one of nine and the three of seven were not used during the six months. The setting of five did not go on the whole time. In fact, we had but 30 retorts going. In my experience a retort is capable of making from 3500 to 4000 feet per day. We have never made more than this; indeed, it is very hard work to get that. I do not think our coal works out at 15s. 2d., including cannel.

Mr. LLOYD: It is 15s. 10d. or 15s. 11d.

Mr. DAVISON: £1030 is your money.

Witness: £1080. We used 10 per cent. of cannel.

Mr. BARLOW: That is during a portion of the time.

Witness: Our cannel cost us 33s. We have had delivered from 20 to 30 tons. We have had a cargo of Newcastle cannel, but it was a mixture of Newcastle and cannel, called Townley cannel. The price of our common coal was 15s. 11d.; the Newcastle alone works out at 15s. 7d.

Mr. DAVISON: That is for the Townley.

Mr. LLOYD: It did include that, but not that alone.

Witness: There is a small amount, I believe, put down for wear and tear in barging the coal; something like 1d. per ton. The cost delivered into the barges is about 15s. 1d. I cannot give you the actual price, because I do not know what are the town dues. At Newcastle it costs us 7s. per ton, and the freight is 7s. 7d. The town dues, I think, are three farthings. We have employed, on an average, 13 men at the works. Our lamplighters work in the yard at the purifiers. We have four at 16s., and one, a lad, at 9s. per week. We have six stokers, but they have not all been employed during the six months. The third was put on in October. There is a meter inspector, a service-layer, and a smith.

Mr. BARLOW: What do you pay your stokers?

Witness: £1 a week. The meter inspector, 27s.; he fixes new meters. The smith we pay £1 per week, and the boy 6s.

Mr. DAVISON: How many settings of retorts had you at Sudbury?

Witness: Five, and three stokers.

Mr. BARLOW: Was three the maximum?

Witness: Yes; for a very short time.

Mr. DAVISON: Three men to attend to them?

Witness: Yes, generally, except in summer time: then there would be only one, of course.

Mr. LLOYD: Tell us how many retorts to each setting?

Witness: Three of fives, and two of sixes.

Mr. DAVISON: Can a Weymouth man do as much work as a Sudbury man?

Witness: Yes. We have ten directors at Weymouth, including the chairman and vice-chairman. Mr. Thomas comes to see us at the works every day. The book produced is the carbonizing-book. It will last us, unless the consumption is very much larger, from six to eleven years. It is a very good book. They are not all bound in the same way. I have no recollection how much was spent at Sudbury in stationery during the six months. The repairs have been estimated at £207 10s., which is at the rate of 4d. per 1000. I put 4d. as the result of my own judgment. I may have spoken to Mr. Stevenson about it.

Mr. DAVISON: And Mr. Penny too?

Mr. PENNY: Now, allow me to answer for myself. I have never had any conversation with Mr. Stone upon the subject.

Witness: I have spoken to Mr. Anderson about it. I have never been examined upon any inquiry of this sort before; and I never prepared an estimate of 4d. per 1000; but I knew that I could take the actual expenditure and divide it by the number of weeks. I have not done that, however, in this particular case; neither have I done it in any other for this purpose. I cannot refer to any particular case where I have done it.

Mr. DAVISON: Did it ever occur to you to work out the repairs at so much per 1000 feet until it was suggested to you?

Witness: I have frequently done this. When the GAS JOURNAL comes in containing various accounts of gas companies, I have very often taken the journal and worked out the different items per 1000, but I cannot say that I have taken this from that.

Mr. DAVISON: You have taken it from Mr. Stevenson?

Witness: Well, we managed together, in going over the thing altogether.

Mr. DAVISON: Now, the 1 per cent. renewal is upon £12,600? Where did you get that from? What is the £12,600 to begin with?

Witness: Well, the supposed capital in works required for Weymouth.

Mr. DAVISON: Who supposes it?

Witness: I suppose it.

Mr. DAVISON: What is that, capital in money or works?

Witness: The capital, I take it, for a company equal to supply Weymouth would be about £12,600. It is 1 per cent. upon that as the capital of the company.

Mr. DAVISON: Well, but if you have £12,600, and keep it in the bank, you will not have it in works; you must spend it.

Witness: Spend it on the works. It is expended on the undertaking—on the whole thing. It is money spent on works, mains, and such like.

Mr. PENNY: Do you mean the money absolutely spent on works?

Witness: Yes, and for renewing them when they gradually go into decay. I have nothing to do with keeping the money at the bank. We have not quite so much as a year constantly out in gas-rentals. It is about a fourth. We should not want the fourth of our rental, but the half of the half year. We have a lime-kiln, and we use it.

Mr. DAVISON: What! to burn your own lime?

Witness: Yes.

Mr. DAVISON: Only for yourselves, I suppose?

Witness: We sell a little. We have sold some the last six months—about £20.

Mr. DAVISON: But do you know that it is against the Act of Parliament? Some one said so. Mr. Lloyd did. It is very odd, though it is in our own Act. However, you sold £20 worth.

By Mr. PENNY: It has been sold to the public generally—to a contractor principally. We have sold but little to other people.

Mr. DAVISON: I suppose that you deduct the amount charged, £30. Is that an estimate?

Witness: It may be slightly an estimate; but I should like to explain. There is £15 5s. 10d. the actual cost to ourselves, after deducting the amount we have received. Then, what we did not sell was burned with some blue lias we had in stock, and I have put the value to the £15 5s. 10d., which makes it £30. I will explain where I have credited the £20 from the contractor. The lime actually cost us £38 4s. 11d. for the half year, that is, for the stone and the limeburner's wages. Then there is lime sold, £22 19s. 1d., and to produce that we had to take a large quantity of blue lias stone from the stock on hand, and we necessarily added that to the amount of £38 4s. 11d., then deducting the £22, it brings out £30 5s. 10d. I have estimated the stock at £15. We have very little lime in stock now. The £40 per annum is the salary we are to pay a clerk when we have got one. We manage without one at present by working hard ourselves. I do the work myself. I was engaged to superintend the accounts and the works. There was a clerk at Sudbury under me, and he acted as collector. I had two little works under my management when there. One was seven miles from Sudbury. We have now a collector at £34.

Mr. DAVISON: Is your secretary in the room? Is he the lawyer at the same time?

Witness: Am I obliged to answer this question?

Mr. LLOYD: It amuses my friend, and it does us no harm.

Re-examined by Mr. LLOYD: I believe there is to be a clerk. We do not employ more stokers than are requisite for the works. It has been hard work for them this winter. We have got an increase of customers. This may be from the cheapening of our commodity. A good many customers said, "We were waiting for the new company to take on." The blue lias lime was sold by accident to a contractor who is building us a tank.

In answer to Mr. PENNY, *Witness* said they could get from 3500 to 4000 feet of gas per day from a retort. Thought they had got as much as 3500 feet.

Mr. LLOYD: You ought to have a certain number of spare retorts out of work to meet contingencies. The proper proportion would be about 10 per cent.

Mr. PENNY said that, from the evidence of the witness, it appeared that with an exhauster they were only getting 3000 feet per day per report.

Witness said that that would be accounted for by the stoppage in the ascending pipes. They had frequently to open retorts to clean out the pipes which were choked. The retorts are small in proportion, and in bad order. They do not produce what good retorts should do. They are 15 inches in diameter. Three or four of them are oval, and larger ones.

Mr. PENNY: When the question was asked about Sudbury, and 27 retorts with one man, you do not mean that you had them all going at once?

Witness: No; when we had them all going we had more men.

Mr. BARLOW: What was the total quantity of gas made in the last half year?

Witness: 12,441,000 feet.

Mr. BARLOW: Did you commence these repairs of the works and mains as soon as you entered into possession?

Witness: Almost as soon.

Mr. BARLOW: When were they completed?

Witness: They have being going on pretty nearly to the present time.

Mr. BARLOW: Is it not possible there may have been some considerable leakage of gas during the process of those repairs, and that may be the reason of the per centage being so large for the past six months?

Witness: There would be an escape of gas during the operations, but not to any great extent.

Mr. BARLOW: There would be an escape?

Witness: Yes.

Mr. BARLOW: You have told us that during the first quarter the per centage was 18, and on the second quarter 11½; then, by taking the average of the two, you say it is 15?

Witness: No.

Mr. LLOYD: No, that is simply an observation I made; the witness did not give us the average.

Mr. BARLOW thought he did; he said it was 18 in one quarter and 11½ in the other, and then some one said the average was 15. It operated in this way: the rental was £542 for the first quarter, and upon that the leakage was 18 per cent. In the second quarter it was £1353, with a leakage of 11½ per cent. If they took the proper average, it was not much above 13 per cent.

Mr. DAVISON: Mr. Anderson puts it at 20.

Mr. *Joseph Cousens*, examined by Mr. LLOYD.

I am one of the directors of the gas company, and a coal merchant of Weymouth. I have the management of the coal operations of the company, and purchase and lay in all the coal. The average cost of the coal into store at the gas-works during the last six months has been nearly 16s. per ton, including the cost at the pit, the freight charges, dues, and bargeing. The cost at the pit's mouth I suppose to be 7s.; town-dues at Newcastle, ¾d.; insurance, 2d.

Mr. DAVISON objected to the course of examination.

Mr. LLOYD asked the witness to give particulars.

Witness: The first charge is 7s.; then there is a small charge of 10s. upon 200 tons; then the insurance ranges from 30s. in the summer to 45s. in the winter; then the freight, upon an average, would be 7s. 9d. I have not had a ship all through the year at that rate, but they average from 7s. to 9s. I have myself paid as low as 6s. 9d., and up to 9s. 6d., but not for this company. Then there is 3d. wharfage at Weymouth, and 10d. porterage. The ingrain is very small—my own for the last three years amounts to about 19 cwt. per cent., rather less than 1 per cent. There is a small gratuity to the captain, each voyage, of a guinea.

Examined by Mr. CLERK: The coal is supplied to the works by whole cargoes. I have been in the habit of getting it for many years from Newcastle. I have not purchased the coals for the company from my own customers in the north. The directors of the company ordered the coals to be bought from Mr. Burdon, as his agent offered to supply them at the same price as he had supplied Mr. Church, and all have been got from Mr. Burdon since then, except one cargo. The gratuity to the captain is to induce him to look after the cargo and prevent waste. £7 per ton is a fair summer freight. There is a small due at Weymouth of 4d. a chaldron of 18 bushels. I am not aware that the usual way to buy coal in the north is by the long hundredweight.

Mr. BARLOW: I think Mr. Church told us he had been in the habit of getting 21 cwt.

Witness: I do not know whether Mr. Burdon used to deliver the long hundredweight to Mr. Church. His terms were that he would supply the new company with coals on the same terms as the old.

William Innes, Esq., examined by Mr. LLOYD.

You are an engineer, and acquainted with coal gas-works generally?—Yes.

And you carry on your business at Bankside and Vauxhall?—Yes.

You are the engineer to the Phœnix Gas Company?—I am.

You have had a very large and extensive experience in gas making?—I have.

Now, have you considered the result of the working of gas companies generally?—I have.

Now, first, let me ask you did you make an investigation as to the rate of dividend, and so forth, and the profits of the London gas companies, and extensively of the country gas companies also?—I did with reference to the Metropolis Gas Inquiry of last year.

Will you kindly give us the result of that investigation?—The result of that investigation showed a rate of profit in London on the average of about 9 per cent., the maximum being 10 per cent. and the minimum being 6.

The UMPIRE: That is in London?—In London.

Mr. LLOYD: Now then, in the country?—In the country the average came to about 8½ per cent.

Can you reduce that into the rate per ton of carbonized coal?

The UMPIRE: That is upon the capital of the companies.

That is upon the capital being used in the various companies.

Mr. PENNY: That investigation extended over a larger number of country companies, I believe?—90.

Mr. LLOYD: Will you tell us what was the average selling price of gas of those companies?—The London average selling price would be 4s. 6d.

I mean the selling price of gas shares?—At the time before any agitation took place they were generally about 50 per cent. above their nominal value.

Paying 9 per cent?—Yes.

Mr. DAVISON: How can the price of London gas shares affect the question which you, sir, have to settle?

The UMPIRE: It rather applies to the price of the shares, and does not apply to the rate at which gas can be produced.

Mr. LLOYD: It is the capitalizing of the profits we are coming to.

Witness: At that time the various companies were obtaining their maximum of 4s. 6d., and also paying maximum dividends, without the fear of disturbance, and there was an assurance from recent investigation that they would continue to do so, many persons having property invested it in gas shares as a perfect security, which raised the commercial value of those shares to a high rate.

That brought them up to 50 per cent. premium?—Yes.

Paying 9 per cent. upon the average?—Yes.

In the country, how would it be there?—A very large proportion of the country gas-works were found to have accumulated their capital out of their profits, and although in appearance there would be a lower rate, absolutely the profit was larger, in proportion for the money paid, than in the London companies, and they were at a still higher saleable rate.

By reason of that accumulation of profits which went in reduction of capital?—Yes.

I think you have reduced that into the rate per ton of coals carbonized?—In the London companies we did it purposely, and we found that about £6 5s. represented the capital employed in the gas-works.

Mr. PENNY (to Umpire): Do you understand that?

The UMPIRE: I do not see it clearly.

Witness: If a company manufacture 100 tons of coal, that placed at £6 15s. would represent the capital of the company employed in the gas-works.

Mr. BARLOW: Does that answer apply to the Phœnix Company?—No.

I have an impression that it is £8 10s. there.—They were in very peculiar circumstances. There was £240,000 of capital employed by that company, which was not earning gas-rental at the time, and in making the calculation we specially exempted that.

Mr. LLOYD: You say £6 5s. represents the capitals of the companies?—Yes.

How would that be in the country?—I found, in the country, that about £4 per ton of coal carbonized represented the capital engaged in the gas-works.

Now, taking the circumstances of the Weymouth Gas Company, as you know them, what in your opinion would be the rate per ton of coals applicable to them?—I think, from what I have seen in relation to them, that £5 would be a fair and reasonable amount of capital for the extent of their carbonized coal, as I observe that the actual manufacturing power of the company is nearly at the maximum; therefore £5 per ton upon the quantity of coal carbonized would fairly represent the capital.

Assuming that to be 2200 tons, it would be £11,000?—Yes.

Then something additional would be required?—I consider there would be £700 required to keep up the works, the stock of meters, and the various other things which practically we call the tenant's capital.

That would be £11,700?—Yes.

I believe you have made an estimate of the profits derived from the working?—I have upon the quantity of coal carbonized, and also upon the income from the coke and other products, and I have placed it at 17s. per ton.

That would have to be reduced by the cannel?—No; I think my estimate is rather under the mark. I did not put the cannel coal quite so high; but since I came into the room I find that they absolutely pay for it 33s., and if you take 10 per cent. of that and add it to 90 per cent. of the common coal it will make up this amount.

In your judgment, ought the illuminating power of gas to be equal to 14 candles?—I think that is a necessity. I think no bill would be allowed to come into operation without it.

Mr. DAVISON: Here is a bill which we have nothing to do with which has come into operation.

Mr. LLOYD: Do you think the customers would be satisfied with less?—No, not metropolitan customers.

And where there are Flintoffs going about they would find it out?—That is so; but commercially 14-candle gas is required in every town supplied with Newcastle coal.

I do not know whether you have before you your estimate of profits upon these facts?—I have it here.

Just go through it?—I find, taking the coal at 17s., and deducting from that the value of the residual products at 7s. per ton of coals, it would leave a net cost for the coals of 10s. per ton, and from the rough copy of account of the expenditure laid out on the works at Weymouth, which was put before me, I think the manufacturing expenditure would be represented by 16s. per ton. That together makes £1 6s. for the cost of carbonizing coals per ton, making for the whole quantity represented as being used—namely, 2200 tons—a cost of £2860 for the year, to which I add, as a necessary fund for the maintenance and renewal of such works, a capital engaged in them at 2 per cent. per annum on £11,000—£220. A portion of the works being leasehold will require a fund for their renewal at some period. That, I believe, would be represented by about £150 per annum, and that and these together make a sum of £3230 as the total outlay to carry on the works and earn the rental. On the other side, the income side, taking the 2200 tons of coal as the carbonized quantity, and the production at 9200 feet per ton, it would give a gross manufacture of 20,240,000 cubic feet of gas, from which I deduct for unaccounted-for gas 16½ per cent., 2,530,000, which leaves to be sold 17,710,000 cubic feet.

Is that in accordance with your general experience?—In accordance with the experience of country towns and several London companies, but not of the Phœnix Company, from circumstances which may be explained afterwards. That makes a sold quantity of 17,710,000 cubic feet, which I divide into two portions, the first or larger portion being the quantity sold to private consumers at 4s. 6d., amounting to 13,989,000 feet, £3447 10s.; and to the public lamps 3,721,000 feet at 4s., making £744 4s.; altogether representing a total sale of gas to the amount of £3891 14s., to which I add, as an income from the meter-rents, £160, making a gross income of £4051 14s.

You do not add what is obtained from residual products, because you have already deducted that?—I have deducted that from the cost of the coals.

The cost of manufacturing being £3230 leaves a profit balance of £821 14s. 6d.?—Yes.

The UMPIRE: You have all this in writing?—Yes.

Mr. LLOYD: The capital of the company £11,700, including stock, the net profit is £821 14s. 6d. If you capitalize that at 16¾ years, you would take the £821 as including everything?—Yes; but as we believe, or as I consider, it is a just and proper way, I would give them three years value of the profits. I add that on as a premium for the profitable trade.

That is an addition to the capital?—Yes.

The UMPIRE: What is that for?—The goodwill of the trade. There is the £11,700, to which I add three years net profits, £2460. But then, from that I think it is proper and reasonable to make a considerable reduction, in order to put the works represented by the £11,000 into a proper state to earn the rental. After a gas-work has been in existence for 20 years a considerable amount of depreciation has taken place. To meet that depreciation, and put the mains and works in a fair and proper condition to continue to earn the income, I think it necessary that a sum should be taken off. That sum I consider should be 12½ per cent. upon the capital, making a deduction of £1375. That leaves a net value for the whole of £12,770.

Mr. LLOYD: And that you consider to be the value of these works?—Yes, with their income of £4400 a year.

Cross-examined by Mr. DAVISON: How long were you at Weymouth?—I have not been at Weymouth.

Never been at Weymouth?—No.

Nor seen the works?

The UMPIRE: I do not suppose he has seen all the country gas-works respecting which he has made an estimate.

Mr. DAVISON: You have had a very large experience. Have you ever been examined as a witness on the transfer of gas-works from an individual to a company?—Not publicly; I have privately.

But I mean publicly, as here?—Not before an arbitration.

But before a jury?—I have been engaged in the sale of gas-works from an owner to a purchaser, and from the owner to a lessee.

But not in an arbitration?—It was not necessary to go before an arbitrator.

The UMPIRE: Have you been before quarter sessions?—Not for valuations.

Mr. DAVISON: During those two gas fights Mr. Hawksley acted for your company and the other companies?—Yes; generally.

And Mr. Barlow too?—Generally.

Mr. Stevenson, Mr. Hughes, and Mr. Flintoff on the other side?—On the opposite side, as far as the metropolitan gas companies are concerned.

I do not know whether they have told you what Mr. Hawksley has said, but do you believe Mr. Hawksley, if he has said it, that the rule in ascertaining the price of gas-works to be transferred from an individual to a company is to take 16¾ years purchase of the net profits?—I think Mr. Hawksley and I will pretty well agree.

Then you agree with him?—I do not agree to the 16¾, but I think the result is pretty similar.

What I should like to do is to get a principle. We have had Mr. Hawksley and Mr. Spice on one side, and we have had Mr. Stevenson and Mr. Anderson on the other, and no one has disputed the proposition—I think one of them confirmed it—that the right way is to take the net profit, and then multiply it by 16¾, to ascertain the value to an owner without statutable powers. Is that your opinion, or is it a false principle?—I think it is a very just mode, provided the capital has been judiciously laid out on the works; but it would not be applicable to a company with a larger capital than is necessary.

Mr. BARLOW: But capital does not come in?—16¾ is very fair.

Mr. DAVISON: And a company with statutable powers would have something more—something like 20 years?—I do not think, if there was a profitable trade, a purchaser would object to that.

Mr. LLOYD: One is 5 per cent. and the other is 6.

Mr. DAVISON: Now then, Mr. Stevenson was examined as a witness on both occasions for the corporation of London before the House of Commons. The corporation had a bill in 1866, and the Board of Trade had a bill in 1867?—He was examined as to the construction of works in 1866.

Now, as to the leakage in London, I believe you would say it is in excess of that in country districts?—I do not concur in that. The leakage in London is as small, having reference to the density of the population, as it is anywhere.

But I did not mean mere leakage, but unaccounted-for gas?—I consider the unaccounted-for gas in London ought to be as low as in any town with a dense population.

Now, what is your present unaccounted-for gas; is it 12 per cent.?—The last half year was obtained at very large cost, in the entire review of the system of mains, and with enlargements to the extent of something like £25,000.

Do I understand you that the large traffic going on in London and the continued opening of the roads for sewerage purposes have nothing to do with leakage?—Very considerably.

Then, in a town like Weymouth—but you have never been there?—No.

But in a town like Weymouth, where there is no very great traffic, except when Mr. Howard drives up to the Burdon Hotel, and from foot passengers, the leakage would not be so large as in London?—It would be larger, from the distance of the consumers one from another, and from the quantity of pipeage supplied with gas.

Mr. BARLOW: What quantity of pipeage is there?—15,000 or 16,000 yards.

Mr. DAVISON: Then have they told you that there is here a customer and there a customer?

Mr. BARLOW: That is about nine miles?—Yes; nine miles to earn £4000, when we get as much return upon 1500 yards.

Mr. DAVISON: Now, then, it takes 1s. 7d. per 1000 to make 10 per cent. dividend upon yours and the London companies?—It takes 1s. 7d. upon our capital.

That gives 10 per cent. upon the open stock and 7 per cent. or 5 per cent. upon the new stock?—Yes; our dividends represent about 8¼ per cent. throughout.

And that is with a make of something like what?—940,000,000 cubic feet.

Now, then, another element in the question of unaccounted-for gas, or leakage, is the amount of pressure?—It depends considerably upon that.

Your company and the metropolitan companies are obliged to have a constant pressure on during the daytime?—Yes.

It is to that you partly attribute your large quantity of unaccounted-for gas?—We attribute a considerable amount to the inch pressure.

The UMPIRE: What is your quantity?—12 per cent.

You do not call that a large quantity?—It is a very small leakage. I think very few companies have so low a leakage.

Mr. DAVISON: You are bound to have a pressure on the whole day, what is it?—An inch head of water—10/10ths.

Whereas at Weymouth it is what?—5/10ths.

In an ordinary country town 5/10ths would be enough?—Yes.

When were you asked to come here?—I think about this day week.

Under ordinary circumstances in country towns 5/10ths would be a sufficient pressure?—I think so.

And therefore the leakage would be to a certain extent reduced?—Reduced.

You cannot tell how much?—No; if you put it at 2 per cent. less you would be safe.

Now your price you have stated is 4s. 6d.?—4s.

You are speaking of the Phœnix, that was reduced last year?—Three years ago.

What are you charging in the country district?—4s. 3d.

But in 1860 your price was 5s. in the country district?—5s. in the country district.

And 4s. 6d. in the town?—Yes; that was before we got our bill.

Before you got your extension of capital. Then when you got your extension of capital, Parliament said you should come down?—Yes.

You are bound not to divide more than 10 per cent.?—8¼ on the average; it is 10 per cent. upon £540,000.

You cannot divide more than 10 per cent.?—Yes.

How can you do it?—With back dividends.

Well, now, you have not given us the average price of gas in the country?—No.

You have got it?—Yes.

Give it me?—4s.

Throughout the country?—No, in London.

But I mean throughout the country?—I cannot give it you throughout the country.

Do you know anything about country gas-works?—Yes; I know some which supply gas at 4s.

Do you know some which supply gas at 5s. 6d?—Yes; several of the character of Weymouth—small towns. But suppose we take Brighton; there they supply gas at 3s. 6d.

Yes, I know about Brighton. There are three companies in Brighton?—No, two.

And Mr. Stevenson was not content with that, but introduced a third company who got a bill. Was he not the engineer of the third company, and were they not before Parliament, and did not Parliament say, "You may have your bill if you will take it at 3s. 6d."?—Yes.

And was not one of the other companies in Parliament at the same time, and did not Parliament say to them, "You shall have a bill upon the same terms"?—They accepted the terms.

And do you know that, whereas they had been paying 10 per cent., their dividends were reduced to something less than 5?—They can go back to the Home Secretary to amend that.

Mr. BARLOW: What can the Home Secretary do?—He could assist them to get up the price.

Mr. DAVISON: Can you give me any other towns similar to Weymouth where the charge is anything like 3s. 6d.? Is it not usually 5s.?—Such a place as Worthing or Hastings; Southampton is too large.

Mr. BARLOW: Hastings is four times the size of Weymouth.

Witness: A good deal depends upon the cost of coal to a place like Weymouth. I was surprised to hear that coal can be delivered at 14s. 4d. per ton. I happened some time ago to carry coal to Southampton, and we got 8s. and 8s. 6d. there. I thought 8s. 6d. was only moderate for Weymouth.

What do you put the illuminating power at, I mean the cost of increasing it from 12 to 14 candles?—Do you mean the cost of production?

Yes?—2½d. per candle.

And so on up to 18?—We require for the increase from 12 candles upwards at the rate of 5 per cent. of cannel per candle.

Does that work out 2½d. per candle cost?—Yes.

Then if Mr. Anderson has said that he can raise 12-candle gas to 14 by an admixture of 5 per cent. cannel, at an expenditure of 0·68d., do you believe it or do you not?—I do not.

You put it distinctly, that beginning at 12 candles it costs 2½d. per candle to raise the quality up to 18?—Yes; as far as practicable by the admixture of cannel.

Then if Mr. Stevenson has said that 1½d. is sufficient, do you think that he is correct?—No; unless you supply 3s. 6d. gas.

Mr. LLOYD: I did not catch it that Mr. Stevenson said 1½d.

Witness: Mr. Davison is referring to another inquiry.

Mr. DAVISON: No, I am not; I am speaking of this inquiry.

Mr. LLOYD: He puts it at 10 per cent. of cannel.

Witness: Five per cent. per candle.

Mr. DAVISON: Well, 5 per cent. per candle. You again tell us that it costs 2½d. per candle to make it up from 12 to 18?

Mr. LLOYD: To raise it from 12 to 14 what would you require?

Mr. DAVISON: Is it 10 per cent.?—Five per cent. of cannel for every candle, and 2½d. per candle is the cost of that if we have 5s. gas.

Well, I suppose all these figures about capital were to account for the great outcry about your large capital?—No; they were to show that the companies were conducting their business as legitimately as they can.

And they do, do they not; not only your company, but all companies?—Yes.

Now, then, £8 10s. represents your own capital?—Not the capital actually employed in manufacture. £240,000 was employed in the preparation of works and purchase of land to manufacture a much larger quantity of gas. The actual capital of the company is £540,000, employed in the manufacture of 110,000 tons of coal per year.

But it works out £8 10s. as against the other companies £6 5s.?—Yes.

You arrive at £11,000 as the total value of these works because you were told that they were nearly at their maximum power of production?—Nearly so.

They did not tell you that the works were capable of making from 30 to 40 per cent. more gas, as Mr. Spice has said?—No, or I should have taken that into consideration.

Now, then, you take £700 as the capital necessary to carry on the works. Is that capital at the bank?—For a tenant, for working stock, it can scarcely be called capital, because it is changing every day; you require stock.

Money at your bankers?—Yes.

Do you think that £2000 is a monstrous sum to carry on these works?—You are dealing now with the cost of manufacture. The £2000 of tenants capital is applicable in another way, because you have all the outgoings for five months to provide for. The meter rental is taken at the end of the quarter, and it is nearly five months before you collect everything. You have nearly all the expenditure of five months to provide.

That five months is represented in the gross receipts?—You may call it half of the expenditure—the half of the £3230.

The total receipts of the year are £825?—No, that is profit.

The total receipts are £4051?—Yes.

Should you not think it necessary then to have more than the £700?—Yes; you would require as much again, because all the wages would have to be paid.

I want to know where you put that. You have made an estimate of the profits, and you have put down the cost of coal at 17s.?—Yes, the cost of coal.

What is the illuminating power of the gas to bemade from that?—14 candles. The way I do is this: I take 90 per cent of Newcastle coal at 16s. and 10 per cent. of cannel at 33s., and if you add that together you will find it rather exceeds 17s.

That is the way you get at it, and you make the whole cost 20s. How do you arrive at the £2860 as the cost of production?—I make the net cost of the coals for the production of the gas 10s. per ton. The first cost is 17s. per ton, from which I deduct 7s. as the value of the residuals, to which are added the expenses of wages, and all the other incidentals of manufacture, making 16s. per ton, which, together with the 10s., makes the cost 26s. per ton for the whole expenditure upon the coals manufactured into gas.

What do you take as the price of coke?—7s. to 8s. per chaldron.

Which do you take?—The value of the products per ton after deducting the fuel.

I am anxious to get correctly the cost of management per ton?—I have taken the figures from the returns which have been made by the London companies.

That is what was used in Parliament last year?—Yes, because it was obtained with great industry, and I believe it contains the truth.

Now, then, directors and secretary, and board-room expenses, are included?—Yes; it is in the 1s. 10d. per 1000.

The 1s. 10d. per 1000 includes all the manufacturing cost?

Mr. PENNY: Except the coals.

Witness: Except the coals.

Mr. DAVISON: Now, you put renewal and maintenance at 2 per cent.?—I do upon the capital; I apply that for 15 years in forming a renewal-fund.

But that is where you cannot divide your profits above the 10 per cent.?—We were then dividing 5 per cent., and when we went to Parliament Lord Redesdale gave us back that capital of £144,000 at 5 per cent.

Mr. BARLOW: What Lord Redesdale allowed you to do was to capitalize what you showed you had expended out of profits?—While we were paying 5 per cent.

Mr. DAVISON: You have not been doing that lately?—I know we tried it in the Chartered Company a year or two ago and could not get it.

Was not this in point of fact for extensions?—No, renewal and maintenance.

However, it is now capital?—Now it is capital; we have no power to do the same thing in future except that we can have a reserve-fund. That renewal and maintenance is now met by a reserve-fund.

You have no renewal and maintenance apart from the reserve-fund?—Except we take a lower dividend; if we divide to the extent of our Parliamentary powers we cannot.

Mr. BARLOW: This £144,000, in what form was it expended?—In repairing gasholders, putting roofs on buildings, rebuilding retort-arches, renewing broken-down mains and services and works—all what we call renewal. When it was extensions, a new gasholder, a gas retort-house, a new building, that was an extension of capital for which credit was taken in the sum that was set aside upon investigation.

Does not the preamble of your Act recite that you had expended this £144,000 which you might have divided, in extensions and enlargements of works?—No.

Mr. DAVISON: But your case was that you had so expended it?—Not in extensions.

But you would never have been allowed to capitalize £144,000 unless you had satisfied some one that you might have divided that sum amongst yourselves if you had chosen to do so?—Oh, no.

I mean unless you had satisfied them that your works were £144,000 better than they need be?—Yes.

Since you got this £144,000 capitalized nothing has been shown in your books for maintenance, but you have a reserve-fund out of which you can make up 10 per cent. dividend if you do not happen to earn it?—Certainly; with one exception, that for leasehold property, we have a leasehold investment-fund still within the limits of our Act.

Well, now, the meter-rents, I presume, were given you?—Yes, as the sum absolutely received.

Now, then, you have introduced a new principle here, which we have not heard of before; you add three years profits on the structural value?—Three years net profits of the trade.

That would be as if the works were taken by a railway company and were to be destroyed; as if they were no longer to exist?—No. It is a premium for the privilege of carrying on the particular trade; if it were to be abolished there would be nothing.

If a railway company took powers to take your works, the Phœnix, they would take them on the supposition that you would cease to carry on the business, and would give you three years profits. Let us suppose the Metropolitan Board of Works wanted to take your works?—They could not use another parliamentary capital for that purpose; a railway coming in, without your consent, could not turn out a parliamentary company.

But if the Metropolitan Board wanted to buy your works, would you upon the structural value place three years net profits?—I should be most happy to do so; we should accept £220,000 on our capital and walk out.

Would you accept three years net profits in addition to your structural value?—Yes.

That would be the right way?—Yes; and very liberal payment.

Mind you do not hear of that again?—If you look at it, it is a very fair allowance for a company like ours to get £220,000. £70,000 a year is about our profit, and £220,000 added on to our capital of £800,000 would be a very fair thing.

That is the whole thing, adding it on to your capital?—Yes.

If that is so we ought to take Mr. Burdon's capital as expended upon the works, and then add three years net profits?—I do not consider Mr. Burdon in the same position as a company.

If a gentleman has spent £20,000, or any sum you like, upon works, that is capital, supposing it has been *bonâ fide* spent. For instance, suppose I satisfied the umpire that Mr. Burdon has spent a sum of £20,000, which is *bonâ fide* invested in these works, I should be right, according to your view as a scientific man, in asking the umpire to give Mr. Burdon three years net profits in addition to £20,000?—I do not know.

What would you give him?—I should first of all ask whether the money was spent.

But assuming it to be spent, should he not have three years net profits in addition according to your view?—I think not.

Well, what would you give him?—If it was a capital consistent with the trade carried on, three years profits would be a reasonable sum to pay; but if the capital has been inconsistently and injudiciously expended, I do not see how you could do it.

The UMPIRE: Then you would inquire not merely into the fact of expenditure but as to the mode of doing it?—As to whether the article now in existence accords with the capital expended.

Mr. DAVISON: But if the umpire was satisfied that the £20,000 was well spent, and fairly represented the capital, then, in your view, you must give him three years net profits in addition?—Yes; but Mr. Burdon might have expended a sum of money in election expenses and have added that to capital.

Does your company light both sides of the river?—No, only the south.

Supposing the people of London had driven you over to the other side of the water for a site to erect your works upon, and you had to make a tunnel to take your gas across, in order to supply the south of London, would that have been a fair expenditure?—I have done that.

It would have been a fair expenditure?—Yes.

Do you know that there is a tunnel at Weymouth?—I have heard of it to-day; I did not know it before. I have had a tunnel under Deptford Creek for many years—for the last 20 years.

Re-examined by Mr. LLOYD: What is the price of gas at Hastings?—It used to be 5s., but now it is reduced to 4s.

Is Worthing about the same?—Worthing is a very analogous place to this; it has become very much larger than it was. If you go to such towns as Hull, or places of that magnitude, where the consumption of gas is much larger in proportion to the area over which it is distributed, you can supply gas at 3s. 6d.

According to the density of the population supplied, and the diminution of the length of pipeage required, there would be a compensating effect against the increased pressure and the heavier traffic?—There would be.

You think that the leakage in London ought not to be greater than in country towns?—Not so great as in country towns.

Then 16½ per cent., in your judgment, is a normal amount of leakage for such works as these?—It is.

That is according to your experience?—Yes.

We heard, and I suppose it is quite true, that from a difference of temperature there is a certain amount of leakage. Is that so?—Yes, there might be from the works to the gasholders, but it is a small matter.

That would be relatively greater in a small town?—Yes.

Of course, in a very large concern, the establishment expenses bear a less ratio to the cost than they would do in a small one?—That is so.

The manufacturing cost may be the same, but the general expenses would be greater?—The establishment expenses of the Phœnix Gas Company have not been increased materially between the manufacture of 50,000 and 100,000 tons. We have the same directors, the same secretary and officers.

Mr. BARLOW: With the same salaries?—Very nearly; there has been very little difference.

Mr. LLOYD: You say 1s. 10d. is the cost per 1000, to which you have to add the cost of coal. Have you worked that out?—It would come out rather over 1s.

It s rather more than that at the present time?—Yes; and it makes the cost is nearly as possible 3s. on the quantity of gas produced.

Mr. *Stone* recalled, and examined by Mr. LLOYD.

The average day pressure is 8/10ths.

Mr. INNES: There is nothing to be allowed for that. It is nearly the same as in London.

Witness: I did not keep a register of pressure. It might vary from 5/10ths to 8/10ths; the letter is the maximum. The day pressure is 8/10ths; if the day is not very cold, it is 5/10ths. We keep it 8/10ths in the day to give the people gas in the town, where they burn it in the cellars, and the dark shops. Some people like to cook by gas.

Mr. *Innes* re-examination continued.

Mr. PENNY: Mr. Davison asked you a question—whether you had heard Mr. Spice's evidence as to the capacity of the works, and you said you had not?—No, I had not.

We told you that Mr. Spice said that the works were equal to 30 or 40 per cent. more than they now produce. Did you hear Mr. Stone's evidence?—Yes.

Did you hear him say that all the retorts were at work at the present time?—Yes; 35.

Did you hear him say how much gas was being made?—Yes; that he was making from each mouthpiece from 3700 to 3900 feet.

Mr. LLOYD: No; 3070 to 3090?—I did not hear it correctly then.

Mr. PENNY: If you were told that the gasholder room was equal to 66,000 feet only, and that they were making 108,000 feet a day, should you say that the works of that company were capable of doing 40 per cent. more than they now do?—I should think that the gasholder capacity was 20 per cent. too low in proportion to the quantity of gas made; that 60 per cent. capacity is not sufficient capacity of gas storeage.

Mr. BARLOW: I think Mr. Spice's evidence took into consideration the putting two small gasholders into repair at a cost of £600.

Witness: We reckon to be safe with 90 per cent. of gasholder capacity.

Mr. PENNY: There is at this time only 66,000 feet of gasholder capacity, and 108,000 feet are manufactured, not on the largest days, but throughout the week; do you not, therefore, agree that in this respect the works are capable of doing more?—I think in this respect they certainly are not.

I should like to ask you about this mode of capitalizing profits, the taking of 16⅔ years, which means capitalizing profits at 6 per cent. I presume, in taking the commercial value, you would understand the purchaser to get 6 per cent. for his outlay?—I should.

He would expect to get that?—Yes.

You would consider that if a man made an investment at 6 per cent. he would expect to get that continuously?—Yes; secured to him.

If the works required a large outlay upon them, that would require consideration?—I should first of all take from the sum I proposed to give, the amount necessary to put them in a position to earn the 6 per cent.

I want this cleared up because of a question which the learned counsel put. That is what the purchaser would expect?—Yes, as permanent income to arise from the investment.

There is one other question as to the Phœnix capital. You explained fairly enough that this £8 10s., which was considered rather large in comparison with other companies, arose from having works unoccupied. What do you say was the actual amount of your plant, and what would it give out in production if all was in operation?—The gas-rental represented by 100,000 tons of coal—the absolute capital was £540,000, to which is to be added the accumulated profits of £144,000.

Mr. BARLOW: That brings it up to nearly £700,000?—£680,000; I find that is really the money capital in the works of the Phœnix Company to manufacture up to 100,000 tons of coal.

Mr. PENNY: You stand in the list of the London companies at £8 10s. Would that represent the carbonization of every ton of coal? You say that some portions of your works are not actually in use—in fact, you have overbuilt. What sum would fairly represent the quantity of work you are now doing?—It would be £6; rather over £6, not quite £6 5s.

Now, applied to the quantity of coals carbonized in the Weymouth Gas-Works, what would that give them as their capital?—About £13,000.

It is not generally considered that the London capitals are too small?—Applied to the Chartered, the Imperial, the South Metropolitan, and the Independent, you will find that the capitals there are scarcely £5 per ton; the South Metropolitan, particularly, is not more than £4.

It has been a reproach to some of the London companies that their capitals are rather too large?—That applies especially to the London and the Phœnix Companies.

The £8 10s. arises, in your case, from your having erected large works which are not yet in operation?—Yes, and the purchasing of a large quantity of freehold land.

But the £6 fairly represents the capital employed in the production of gas?—Yes.

Mr. BARLOW: I asked you, Mr. Innes, a question just now with regard to the Phœnix Gas Company's Act of 1864, to which you replied that in the preamble there was no declaration that the sum of £144,000 had been expended in extensions and enlargements. Since I asked you the question I have sent for the Act, and you will find your answer is not quite correct.

Witness (examining the Act): This is right.

Then do you wish to correct the answer?—No; the one is quite consistent with the other. The expenditure of the £144,000 was the actual savings from the divisible profits, expended on repair and sustenance of the works.

I beg your pardon. It says, "Extensions and enlargements thereof."

Mr. DAVISON: It is more even than that, because it says, "The funds were insufficient, and from time to time profits had to be expended." (To witness:) That is not true, then?—The expenditure of the capital went on simultaneously with the expenditure of the profits until 1853, when £500,000 of capital had been expended, and 1 or 2 per cent. per annum was the expenditure required for the repair and sustenance of the then existing works, expended at the rate of £2000, £3000, £4000, and £5000 per half year.

Mr. DAVISON: Just so; it is a mistake to mislead Lord Redesdale. "Such amount being found insufficient to carry out such works, they have from time to time expended various sums of money," &c. That is all untrue?—No, it is not; I drew the paragraph myself.

Mr. BARLOW: Can you tell us what the cost of coal per ton is to the Phœnix Company?—About 15s. 3d.

Is that the price now, or the price in 1866?—In 1866.

I have a paper before me in which the cost of coal is set down at 15s. 9$\frac{72}{100}$d.?—That is including the cost of carriage into the works.

This is compared with 17s. at Weymouth?—Yes.

You gave us a sum of 7s. per ton as the value of the products. What do the products realize in the Phœnix?—9s. odd.

So that, in fact, with a cost of coal 1s. greater here you allow 2s. less for products?—I do not think the Weymouth Company would manufacture like the Phœnix Company, that is out of the question.

That is your explanation? The effect is simply to charge the coals 1s. higher per ton consumed, and credit the company with 2s. per ton less?—You know as well as I do, Mr. Barlow, that the manufacture in a country place like this absorbs 50 per cent. of the fuel.

I know no such thing; if it exceeded one-third I should inquire into it. What is the total cost of those items which you put down at 16s. at Weymouth, in the account of the Phœnix Company?—I think they come to about 14s. 3d. [Return examined.] 13s. 3d.

No, 13s. as against 16s. in Weymouth?—I think that would be right. I fear I have understated it.

What was the value of the Phœnix £100 shares previous to the agitation?

We had no £100 shares; our £20 shares before the agitation were worth about £30.

That would be about 50 per cent. premium.

Mr. PENNY: What are they worth now?—£24 or £25.

That is one thing you did not give us—you gave us the value before the agitation?—They are worth £24 10s. to £25 now.

That represents the average in all the companies?—I think the Chartered represents the largest depreciation.

Mr. LLOYD: I do not understand about the 13s. Is that per ton?—Yes, with all the advantages of a large trade upon our working expenses, as applied to a small country gas-works.

Then that satisfies you you are right?—Yes; that 16s. is the right amount.

Mr. DAVISON said that he should like to ask Mr. Anderson a question, but he was afraid that in doing so he should get more than he had bargained for. Mr. Anderson, on the previous day, had said something about the unaccounted-for gas at Dover. He said it had never been so low as some figure that was given to him.

Mr. *Anderson* recalled, and examined by Mr. DAVISON.

I cannot say that I know the handwriting of the paper produced. It is one of the forms I supply, as lessee of the Dover works, showing, amongst other things, the amount of leakage. I do not wish to correct my former answer. I said per annum, and I was asked per annum; and, to illustrate the subject thoroughly, I will put before the arbitrator now the actual figures, spreading over seven years, which figures show that the leakage has been 15·2.

The UMPIRE said that the paper had reference to six months leakage only. What was the passage in it that he wished to refer to?

Mr. DAVISON: I will put it in.

Mr. BARLOW: Allow me just to state the circumstances. I was under the impression that Mr. Anderson's answer was not correct, and I looked at some papers I had and took this from them. I put this paper into Mr. Penny's hands just before the adjournment, and asked him to show it to Mr. Anderson, and ask Mr. Anderson whether he had any further explanation to make. I do not know how it got into Mr. Davison's hands.

Mr. HOWARD: I took it up; I found it on the table.

Mr. DAVISON: It only amounts to this, that in the six months the leakage was 10 or 11 per cent.

Witness said that it was a return of the leakage which he was compelled to make, in virtue of his agreement, every six months. But those returns could not be corrected to 1 or 2 per cent., because there might be a day or more, or half a day difference in taking the meters, and if they took the meters a day late they really had more gas paid for than they ought to include. They had therefore to take the average of it. The year must be taken, because each meter was taken four times per annum; but if they took each quarterly, in the particular year to which the paper referred the leakage was only 14·3.

Mr. DAVISON objected to this evidence.

Mr. LLOYD said that the witness spoke from his own knowledge.

Mr. DAVISON: But he speaks from books which are not here.

The paper was handed to the umpire, and a brief discussion followed.

The UMPIRE observed that a great ado appeared to be made about nothing. If they had been inquiring into the supply of Dover, and a material point had been the loss of gas there, then this evidence might be important; but when a man who had a great number of gas concerns in different parts of the country was asked, when upon the Weymouth gas, something about Dover or Canterbury, it possibly was too much to expect that he should be absolutely accurate.

Mr. PENNY here said that the document was Mr. Barlow's, and he asked that it might be given back to him.

Mr. *Anderson* said that what he did say was that he could manufacture 14-candle gas with Newcastle coal and 5 per cent. of cannel coal, and that the extra cost of employing that 5 per cent. of cannel, instead of all Newcastle, was about 68 decimals of a penny per 1000 feet.

Mr. *Burdon* was recalled, and, in answer to Mr. LLOYD, said that he had searched his papers for the purpose of finding some of the accounts that had passed between himself and Mr. Church, but he was sorry to say that he could not produce any in the shape of actual accounts. He hoped, however, to be able to give the umpire something which would be exactly as good. He had found the counterfoils of cheques, but not the whole series of accounts which he had given to Mr. Church. [Account for January, 1863, produced.]

Mr. DAVISON: That would be the last.

Witness: The last. Mr. Spice takes his figures from this date. I have made no payment to Mr. Church since then.

Mr. LLOYD: This is an account furnished him in 1863 of what Mr. Church charged to him.

Witness: This is almost all for money expended in the extension of the works. Mr. Church was bound by his lease to repair, therefore I was under no great expenditure in that respect. I have paid him what he charged as laid-out capital on the works. This account will come up to £1433—the cheques that are there marked. I am exceedingly sorry, but from time to time I got such an accumulation of papers that, occasionally, I was obliged to hand them over to the housemaid to light her fire with, and I think in that way the accounts of Mr. Church have been destroyed.

Mr. BARLOW: When does this £1433 commence?

Witness: In 1860 my first payment to Mr. Church took place.

Mr. BARLOW: What date? I want to see whether they are in the book handed in by Mr. Church.

Witness: October, 1860, £300.

Mr. DAVISON: The last is in June, 1864.

Mr. BARLOW: Will you take the intermediate ones?

Witness: October, 1860, £300; February, 1861, £100; April, 1861, £100; and March, 1861, £51 16s. 7d.

Mr. BARLOW: He has got it here as May.

Witness: It is May. January, 1863, £541.

Mr. BARLOW: Here is an item for five retorts, £32 11s. 1d.

Witness: That will be comprehended in my £541. I made all payments to him by cheque. The next is in 1864.

Mr. BARLOW: Here is an entry, January, 1863, £541 13s. 7d.

Witness: That terminates then. Mr. Spice's account begins from that date. These are all parts of my extensions of capital. It is very trifling for renewal.

The UMPIRE: The payments which you made of gross sums, £300, £200, &c., are payments made on account and not in reference to any particular bills.

Witness: No, paid from time to time on account of extensions—new work. A great many things have been renewed since Mr. Church went there.

Mr. LLOYD here referred to a placard, and asked the witness if he recognized it.

Mr. *Burdon* said that unless the original letter was before him he could not do it. He did not get it printed himself.

The UMPIRE: What is the last payment by cheque?

Witness: June 6, 1864, in Mr. Spice's account. The amount in 1864 was £240 9s. 7d.

Mr. DAVISON thought it would be found that the total amount of the cheques was £1433 6s. 2d. Two of those cheques, one for £100 and the other for £140 9s. 7d., were dated June, 1864, and that was the period covered by Mr. Spice's award; but he thought it would be probable those were sums due in 1863 and paid in 1864; at any rate, they were not included in Mr. Spice's account. This was a clean account, irrespective of those payments.

Mr. LLOYD thought that the witness had not derived much profit from the works at present.

Witness: I beg your pardon.

Mr. LLOYD asked for an account to be produced, showing what had actually been received. He had paid more than he received?

Witness: Oh, yes; but not every year.

Mr. LLOYD: You have paid more than you have received?

Witness: No, no; no such thing.

The UMPIRE: What do you say?

Witness: That I have received more than I paid.

Mr. LLOYD: Does that include what you have to pay under the award?

Witness: If it means what I have to pay under Mr. Church's award, that is a different thing.

In reply to Mr. DAVISON, *Witness* said that he had been receiving income from the works for the last few years—about £1500. Mr. Church's profits were about £1700, and his own about £1500, and there were certain deductions from the amount.

Mr. DAVISON said that the umpire had on his notes, from Mr. Spice, the amount which was in the award. He wanted to know whether the arbitrators were clear about it—that Mr. Paddon and Mr. Spice settled the amount due from Mr. Burdon, and what it was for.

Mr. LLOYD thought that his friend was going a little too far. The award could not bind them in any way.

Mr. DAVISON did not say that it did, but it was in evidence to a certain extent.

The UMPIRE: The award was put in.

Mr. DAVISON: But the award did not show it. One great question between them was, whether the payments were payments on capital account, or payments which ought to go in reduction of the profits. Mr. Spice had distinguished capital from renewals and repairs. It must be taken for what it was worth, subject to observations. He wanted the arbitrator to be clear how the matter stood; whether the expenditure between 1863, when the account ended, and the time when the company took possession of the works, was a certain sum, and what it was for could only be proved from the book of Mr. Waters. That was the only evidence they had, coupled with the fact that Mr. Spice checked the book, acting for Mr. Church.

The UMPIRE said that Mr. Church, the lessee, was certain to claim as much as he could from Mr. Burdon, and Mr. Spice acted for him; then they had a reference, not being able to settle accounts without it.

Mr. DAVISON: But the important point is, that you should know, apart from the £2177, the valuation of the stock, what the other sums were for.

Mr. LLOYD said that a portion, no doubt, was for extensions, which might go to capital.

Mr. CLERK said that, the books not being produced, there was the best possible secondary evidence, by Mr. Spice having verified the accounts with the books.

Mr. LLOYD: The book of Mr. Waters, if admissible, must speak for itself; Mr. Spice need not be recalled.

The UMPIRE: Mr. Waters says, "I made this up from the other books," and then he put them in the fire.

Mr. DAVISON: And then Mr. Spice says, "I have all the books, and checked these items by them." I want the umpire to have on his notes all the sums, whether paid, or awarded to be paid—whether it was capital or for repairs. Just see what they are doing, to suit their own purposes. When they think they cannot get it, and that Mr. Burdon can bring no more books, then they badger him for more; and when they can get them, they are content to take these counterfoils, although they can obtain from Mr. Spice the information they require. He said he saw these things in the book, and this is the correct account. One secondary evidence is as good as another, if the primary is destroyed.

Mr. LLOYD objected to Mr. Spice being called to say, "I awarded so much for this particular thing."

Mr. BARLOW: On the evidence Mr. Spice says that, in addition to the value of the undertaking, he claims £491 for an exhauster and engine; £2177 for stock in trade, £150 for coals, and £750 the value of the surplus land. At one of the sittings I was asked to subdivide certain items, which I did.

Mr. LLOYD: Mr. Barlow, of course, knows all about it, and I cannot shut out his knowledge.

Mr. BARLOW: I have it on my notes how much was awarded for stock, how much for extensions of plant, how much on the balance of general account, and how much on the balance of rental account.

Mr. LLOYD said Mr. Barlow did not supply them himself, but accepted what the arbitrators had agreed on.

Mr. BARLOW said that the whole was agreed upon, except the value of the gas-rental and the outstanding debts.

The UMPIRE: They were agreed upon by Mr. Spice on the one hand, and by Mr. Paddon on the other.

Mr. LLOYD then addressed the court at considerable length on behalf of the company, after which the proceedings were again adjourned.

WEDNESDAY, JAN. 22.

The whole of the sitting this day was occupied in hearing Mr. DAVISON sum up the case on behalf of Mr. Burdon, and this closed the proceedings.

The UMPIRE, by his award, gave to Mr. Burdon the sum of £26,350 and the costs of the arbitration.

THE WORTHING LOCAL BOARD AND THE GAS BILL.—At the last meeting of the local board the clerk read the following brief communication:—"Mr. Flintoff will be glad to assist in the arbitration of the gas bill." Mr. Breads moved that the board should acknowledge Mr Flintoff's letter, declining his offer with thanks.—*West Sussex Gazette.*

DUBLIN WATER SUPPLY.—The overtaxed artisans of Dublin are likely to have cause to regret the day when their representatives gave their assent to the gigantic Vartry works scheme, for there seems no end to the extra expenses which it is entailing. Actions have been pending for some days at the Wexford Assizes against the corporation on account of injuries sustained by three persons in Newtown Mount Kennedy through the bursting of the water-pipes in that town early last year. The actions were compromised on Tuesday, the corporation paying the claimants £500.

USE OF THE LIME-LIGHT IN BARRACKS.—On Monday evening a series of experiments with the lime-light were conducted in the Queen's Barracks, Perth, with the view of testing the practicability of its introduction instead of gas, the Horse Guards having resolved to discontinue the use of gas in the Perth barracks, owing to its recent rise to 6s. 8d. per 1000 feet. The experiments were made in the open air, in one of the lobbies extending the whole length of one of the wings of the barracks, and in one of the ordinary barrack-rooms. An apparatus, about 20 feet high, was erected in the square, having at the top an appliance for showing off the light and a reflector above. When the flame was applied and the light regulated the entire square was lighted up almost as clear as noonday, it being quite easy to read the smallest print at a distance of 100 yards. In the lobby a light of small size was used, covered with a glass globe, and the flame burned so brightly that a pin might have been seen on the floor at the extreme end of the lobby, a distance of fully 30 yards. The company then adjourned to one of the ordinary barrack-rooms, where a very small apparatus was fitted up; and, on the light being applied, the room was lighted up much more brilliantly than it would have been by gas. In fact, if there was any fault, it was that the light was too brilliant for the size of the room. The experiments were witnessed by a scientific gentleman from London sent by the War Office, and by the colonel commanding the Royal Engineers in Scotland, both of whom expressed themselves highly satisfied. We understand that contracts have been entered into for using it in the camp at Aldershot, and Government intend shortly to introduce it into all the barracks in the country.—*Edinburgh Courant.*

Miscellaneous News.

UNITED GENERAL GASLIGHT COMPANY.

The Half-Yearly General Meeting of this Company was held at the Office, 3, Jeffrey's Square, on Tuesday, the 10th inst.—R. HUDSON, Esq., in the chair.

The SECRETARY (Mr. D. W. Ogg) having read the advertisement convening the meeting, the following report and accounts were taken as read:—

The directors have to submit the following report and accompanying accounts of the operations at Limerick station for the half year ending the 31st of December last.

The number of gas consumers supplied by the company has increased, and there would have been a corresponding improvement in the rental but for the general depression of trade, which has affected the consumption, more especially among the larger consumers.

The result is that the rental, as compared with that of the corresponding half of 1866, is £140 less, but there is reason to expect that this diminution will only be of a temporary character. The sale of residual products shows an improvement of about £40, and the cost of the coals was £70 less. The pensions of two of the annuitants of the company, amounting to £19 10s. a year, have been redeemed on equitable terms.

The current profits of the half year amount to £935 1s. 11d., which, added to the balance of profit and loss, £50 14s. 3d., make a total of £985 16s. 2d., out of which the directors recommend the proprietors to declare a dividend at the rate of 2s. per share, free of income-tax, leaving £85 16s. 2d. to be carried to the next account.

The directors are sorry to have to report an accident to one of the small gasholders on the night of the 18th ult., during a terrific gale of wind, which broke one of the columns, and the holder, deprived of this support, ultimately overturned, the gas escaping, but causing no other damage to the works, nor was there any inconvenience to the company's customers.

The holder is a good deal injured, and the engineer has been instructed to report on the damage, with an estimate of the cost of repair. At present it is thought that the expense will not be much more than £100, but as the telescoping of this vessel was to have been taken into consideration this season, the whole matter will be treated as one question.

Dr. *Abstract of the Limerick Working Account, for Half Year ending December 31, 1867.* *Cr*

To Coals			£1,790	15	9	By Gas-rental to September	£825 14 11
Wages			348	5	5	Ditto to December	2,253 10 2
Salaries			236	10	0		£3,079 5 1
Rent and taxes			135	1	8	Residual products	968 9 11
Charges			79	18	1		
General expenses for London management			50	0	0		
Bad debts and allowances			150	15	5		
Wear and tear			150	1	4		
Depreciation of plant			111	0	0		
Gas-meters			60	5	5		
			£3,112	13	1		
Balance—working profit			935	1	11		
			£4,047	15	0		£4,047 15 0

Dr. *Appropriation for Dividend.* *Cr.*

To General expenses		£82	12	1	By Balance brought down		£985 1 11
Pensions of the company		85	9	6	Old balance of P. and L.	£119 5 2	
	£168 1 7				Interest dividend on Consols, &c.	99 10 8	
Balance—net profit	985 16 2					218 15 10	
	£1,153 17 9					£1,153 17 9	
Dividend on 9000 shares, at 2s. per share	£900 0 0				Balance brought down	£985 16 2	

Dr. *Balance-Sheet, December 31, 1867.* *Cr.*

To Capital received		£450,000	0	0	By Redemption of Dublin pensions, and other small payments		£117 19 7
Less Messrs. Hawksley and Barlow's award	£240,000 0 0				Investment at Limerick	£22,130 15 9	
Deducting amount not yet paid as returned capital	11 13 4				Gas-meters	2,005 12 9	
		239,988	6	8	Stocks, book debts, &c.	6,816 4 10	
	£210,011 13 4				Retorts, fire-goods, &c.	567 7 8	
Deduct loss in Dublin	£143,298	2	0		Cash in hands of agent	277 17 4	
Ditto in Cork	28,601	18	0			£31,797 18 4	
	£171,900	0	0		Balance at bankers	£590 12 2	
Compensation to London officers	2,100	0	0		Ditto Bank of England	5 0 0	
	174,000 0 0					595 12 2	
	£36,011 13 4				Invested in Consols	£5,463 15 0	
Unpaid dividends	235 18 0				Interest thereon	87 15 0	
Sundry tradesmen—outstanding and accounts	329 12 7					5,551 10 0	
Loan account	500 0 0						
Profit and loss—							
Current profits	£935	1	11				
Balance former profits	50	14	3				
	985 16 2						
	£38,063 0 1					£38,063 0 1	

The CHAIRMAN addressed the meeting, and pointed out that although in the Limerick rental there was apparently a small diminution of revenue, as compared with the corresponding period of last year, yet actually that was not the fact, for the business had generally so increased as to lead to the full expectation that they should make up the amount by next half year. The accident referred to in the report had been caused by one of those extraordinary storms, stated as more severe than had occurred in Limerick for 40 years, and as gas companies were all liable to accidents of this nature, the company did not stand alone in this particular. The expense of repairs stated in the report would not, in all probability, be so much as estimated when taken in conjunction with the telescoping, and which cost the direction, quite independently of the accident, had considered necessary from the rapid increase of the company's business during the past twelve months. Before moving the adoption of the report, he would be happy to hear any remarks and answer any question the proprietors had to put to him.

Mr. LYSLEY was glad to hear that two of the annuities of the company had been redeemed on equitable terms—and which no doubt he might understand as satisfactory ones—and trusted the directors would endeavour to effect like bargains with the remainder, as, in his opinion, so large an amount of capital reserved for the purpose of paying them was unnecessary.

Mr. KNIGHT differed completely from the previous speaker, and very forcibly and with admirable effect drew the attention of the meeting to what had fallen from Mr. Gregory at the previous meeting in September on this subject, a most important one in his opinion, as it was highly impolitic for the company to bare themselves of capital, particularly if they contemplated appearing as sellers of the company's station at a future period.

Several PROPRIETORS having assented to this course, and Mr. GODFRY having replied to what had fallen from Mr. Lysley, whom he regretted to find still each half year pressing on the board what he considered an unwise policy,

The report and accounts and a dividend of 2s. per share were passed unanimously.

A vote of thanks having been proposed by Mr. KNIGHT, seconded by Mr. LYSLEY, and acknowledged by the CHAIRMAN, the proceedings terminated.

MANCHESTER CITY COUNCIL.

The City Council met on Wednesday, the 4th inst.—the MAYOR presiding.

GAS PROFITS.

The Gas Committee reported that, in compliance with the resolution of the council of the 4th of September last, they had carefully considered what course it might be desirable to take to secure to the ratepayers an amount of profit equal to 10 per cent. upon the amount of their capital employed in the manufacture of gas. As the cost of the materials used in the manufacture and the value of the residuary products vary from time to time, it is not possible to secure each year a uniform rate of profit. During the last eight years, notwithstanding that several reductions have been made in the price charged for gas, the profit has slightly exceeded an average of 10 per cent. per annum upon the capital employed, and the committee have reason to believe that, when the large extent of new plant in course of construction at both stations has been brought into full operation, the same rate will be maintained upon the average of any short series of years. If, however, these expectations should not be realized, it would then be necessary for the council to adopt the only remaining method by which the amount of profit can be increased, namely, that of advancing the price of gas. The committee did not at present deem it desirable to recommend the adoption of that course, being of opinion that the deficiency would prove to be only temporary. In order, however, that the amount applicable to improvement purposes might not be subject to the fluctuations experienced in former years, they recommended that a sum be paid over each year to the Improvement Committee equal to that to which that committee would be entitled if a gross profit of 10 per cent. upon the capital employed were obtained. By this arrangement it was estimated that the Improvement Committee would receive in respect of the current year the sum of £25,000, or thereabouts, and would for a time continue to receive a larger sum than the amount of gross profits will appear to justify. It was proposed that the balances so overpaid should be carried to a suspense account, the amount of which the committee anticipated would be recouped to them by the additional profit realized when the extensions now in progress were completed, and the whole of the outlay had, by the natural increase of business, become productive.

Alderman CREWDSON having moved the adoption of the report,

Alderman GRUNDY said that having for several years past directed the attention of the council to the appropriation of gas profits to the improvements of the town, he should take the opportunity of seconding the resolution approving of the report, because the committee had practically conceded that for which he had so long been contending.

Councillor C. THOMPSON hoped the council understood what they were going to undertake by this resolution. They were going to adopt the probable profits of the committee in the very face of a deficiency, and they were not sure they could make the profit there named in the future. He thought, therefore, if this resolution were adopted the committee should be guaranteed against any reflections upon its management, supposing the profits did not turn out what they were calculating upon.

Alderman LAMB was glad the committee had done what they had without interfering with the price of street-lamps, for since they were reduced in price their number had increased considerably. As to the committee being able to give this sum for improvements, why, they ought to have allowed it for years past. But instead of that they had been increasing their capital, so that their property, which in 1860 was worth £86,000, was now worth £220,000.

After some remarks from Alderman RUMNEY, Councillor HOPKINSON, and Alderman CURTIS,

Councillor WOODWARD thought the principle which the committee were proposing to carry out was a very bad one, because it was paying profits out of capital.—The resolution was then adopted.

ELECTION OF AN OFFICER OF HEALTH.

The Building and Sanitary Regultations Committee reported that on the 4th of September last the council had before them a motion for the appointment of Mr. John Leigh as officer of health, in accordance with the recommendation of the General Purposes Committee, and an amendment was ultimately adopted referring the consideration of the subject back to the committee. On the 8th of January last the council adopted a recommendation of the General Purposes Committee, that the building and Sanitary Regulations Committee be instructed to advertise for candidates, the remuneration offered not to exceed £500 per annum. In accordance with that resolution, the committee advertised in the local papers and in the London *Times;* and, besides an application from Mr. Leigh, they received applications for the appointment from the following gentlemen:—viz., Dr. Reed, Royal Infirmary, Manchester; Major Charles Cheetham, Royal Arsenal, Woolwich; Dr. T. R. Woodifield, Sunderland; Dr. T. B. Wright, Gainsborough; W. H. Sullivan, Harrow Road, London, sanitary inspector; Robert Gifford, sanitary inspector, Town Hall, Brighton: Dr. Lightbourne, Corporation Street, Manchester; Dr. W. Legge, Codnor Park, Derbyshire; Dr. E. J. Syson, Wath-on-Dearne; Dr. C. J. Allen, Alton, Hampshire; Dr. H. Lambert, Dysertmore, New Ross; Dr. Chas. Wm. Philpott, London; Wm. L. Langley, inspector-general, Army Hospital, Devonport; Rev. James Tanner, King Edward Grammar School, Chelmsford; Joseph Spicer, surveyor, Board of Health, Stockton-on-Tees; Wm. Sall, M.D., deputy inspector-general, London; P. P. Nind, St. Bernard's, Torquay; Col. J. A. Stewart, Oxford Villa, Marlow, Bucks; B. B. Young, Lieutenant 43rd, Torquay; James Cook, St. George's Place, Longsight; Dr. John Torry, Lincoln; M. J. M'Cormack, Southampton; George Shaw, Hencoates, Hexham, Northumberland. After careful consideration of the applications and the testimonials received, the committee determined that it was desirable to have a personal interview with the following gentlemen:—viz., Dr. C. W. Philpott, Dr. Reed, and Dr. E. J. Syson, as also with Mr. John Leigh. They, therefore, had, on the 19th day of February last, an interview with each of the gentlemen named, and now recommend the appointment of Dr. Reed as the officer of health for this city by the council.

Alderman HEYWOOD moved that Mr. Leigh be appointed the officer of health. He said that great credit was due to the sanitary committee for the manner in which they had discharged their duties. It was apparently a matter of extreme necessity to interfere with existing property without compensating the owners; but the unobjectionable manner in which the business of this committee had been carried out, and the great caution which had been exercised generally by the committee, entitled them to the utmost consideration on the part of the council as well as of the community. But notwithstanding all the labours of this committee, and notwithstanding all the labours of the Sanitary Association, which was called into existence some years ago, and the improved arrangements which had been introduced in connexion with the dwellings of the working classes, the immense number of streets which had been paved and sewered, and the drainage of passages and of nearly the whole of the ashpits throughout the city, the death-rate of Manchester was almost the same as it was in 1836. It was to him a matter of grave importance that, notwithstanding all the efforts that had been made, the rate of mortality remained about the same as it was 30 years ago. The attention of the council had been called frequently to this question by the Sanitary Association, and there was an evident feeling on the part of the Legislature to compel corporations to deal with the public health in a much more energetic manner than hitherto. In Liverpool they had an officer of health, exercising powers somewhat similar to those which it was proposed to give to the officer now to be elected for Manchester. Parliament was prepared to deal with this question perhaps in a more offensive manner than the feelings of the inhabitants would be disposed to admit of. During last year a bill was introduced into Parliament for the improvement of the sanitary condition of the dwellings of the poorer classes. That bill, after much discussion, was ultimately withdrawn; but notwithstanding its withdrawal last year, it appeared again before the Legislature, and would come on for discussion before long. One clause of that Act made special reference to the recognition of the powers of an officer of health to order structural alterations in premises where necessary to remedy conditions prejudicial to health. He had the greatest possible confidence in submitting the name of Mr. Leigh to the council. Mr. Leigh had been for a number of years observing and reporting upon such subjects as must necessary come under the control of an officer of health, and his appointment would be a guarantee to the public at large that whatever steps were taken by the council would be recommended by Mr. Leigh with the same care and judgment that he had displayed throughout a long life. It had been objected that Mr. Leigh was too old; but the same objection might be taken to himself, and to a great many of the present members of the council.

Alderman RUMNEY seconded the nomination. He did not know of any appointment which the council had had to make for many years so important as that which they were now about to make. It was a totally new office. There were many in the council who looked upon the creation of this office with considerable doubt and suspicion—men who had carefully considered the matters to which the office related for many years. He did not believe in that popular but most delusive doctrine that, the fever-rate being high, they could at once reduce it by employing a medical officer. There were causes more potent in operation, which no medical officer could remove, in spite of the wilfulness and perversity in evil-doing of the inhabitants. It seemed to him important that they should have a man who would not lead them into any wild-goose chase, but who had experience in these matters, and whose sound judgment and discriminating power should rather guide the council to the adoption of the wisest and best measures which were within their province. It was, above all things, necessary that the new officer of health should be a thoroughly good practical chemist. They did not want a fever doctor, but a man who would take the atmosphere of a house in which the epidemic was, bottle it up, analyze it, and report upon it; and that was what no mere medical man could do. He doubted if there were half a dozen medical men in Manchester who could do so. No man who was not a good chemist could do such things. The question as to the effect of smells, and of the decomposition of fœcal matter, was still unsolved. The influence they had on health was not determined. It had been his fortune to listen, year after year, to the discussions at the British Association, where there assembled some of the most eminent medical men in the kingdom. One who stood as high as any amongst them—Professor Bennett, of Edinburgh University—had challenged them to prove that there was any immediate connexion between any smells and fever. The council wanted in their office of health a man who could take analyses of the atmosphere and of water, and every one of the elements surrounding us and in daily operation, and so arrive at the predisposing causes of the enfeebled tone of health of the population, and adopt remedial measures which would benefit the whole country. Nothing but chemistry could solve these problems, and the council must, therefore, have an officer who, by his habits and by his practice, was competent to do these things. Mr. Leigh was acknowledged to be beyond question an authority on the chemistry of gas. He had made several important investigations and valuable reports as to the causes of epidemic disease, and had high testimonials in his favour, whereas Dr. Reed had no experience outside the walls of a hospital.

Mr. SWANWICK moved the appointment of Dr. Reed, in accordance with the Building and Sanitary Committee's recommendation. He said he laboured under a disadvantage, because the town-clerk had been canvassing members of the council adversely to Dr. Reed for the last day or two.

The MAYOR, interposing, reminded Mr. Swanwick that the town-clerk was not present, and if he were, not being a member of the council, he could not reply; he therefore requested Mr. Swanwick not to introduce personal matters.

Mr. SWANWICK said it was extremely unfair that things should be said against Dr. Reed to which that gentleman had no opportunity of replying. He did not dispute Mr. Leigh's qualifications, but the testimonials Dr. Reed had produced were an honour to any man who was able to produce them. They were from the first medical men and chemists in the country, and represented Dr. Reed as distinguished by great ability, indefatigable energy, and great administrative capacity, power of organization, tact, skill, and discretion. Mr. Leigh was of an age when in all probability he would have to retire in a few years, and the council would be in the same position they were now in, having to elect an officer of health, when they would be glad to get a gentleman with the qualifications Dr. Reed possessed. It was also an objection to Mr. Leigh that he held two other appointments at the present time, and did not even profess to give his whole time to the duties of this new office. On these grounds he moved the appointment of Dr. Reed. A great public responsibility devolved upon the council to get all the time, all the attention, all the mind, and all the vigour which a well-qualified man could give to the duties of officer of health.

Mr. COOPER seconded the nomination of Dr. Reed. He was firmly persuaded that the council would have the right man in the right place if they made Dr. Reed their officer of health. He had come to that conclusion in the most impartial manner. A fortmight ago, before he entered into the examination of Dr. Reed's testimonials and position, if he had any predilection at all it was in favour of Mr. Leigh. But he took a deep interest in the investigation conducted by the Building and Sanitary Committee, and if the members of this council generally could have been on that committee, and gone through the testimonials with the individuals themselves, as the committee did, he believed there would have been a very large majority in Dr. Reed's favour. The case was one of Dr. Reed on his own merits *versus* Mr. Leigh with an enormous amount of prestige. Whilst many gentlemen had come to support Dr. Reed, who previously had thought they would support Mr. Leigh, there was not one who had ever supported Dr. Reed who had since made up his mind to vote for Mr. Leigh. No doubt it was a good thing the council were unanimous in appointing a health officer for this large city, which had so unenviable a pre-eminence in its death-rate; he only wished they could be equally unanimous in the choice of the individual. The council had done a wise thing in delegating the matter to the committee's examination, and it now became the council to remember very seriously that, after that investigation, the committee had recommended the appointment of Dr. Reed. He would only refer to one of the testimonials in his favour, and that was with special reference to something that had been said of Dr. Reed's position in the infirmary. The resolution of the Infirmary Board was a public document, with the signature of a responsible man; it was passed by gentlemen whom the council would all respect as the directors of the institution, and whatever these gentlemen might say as to Dr. Reed's responsibilities and merits must outweigh all the gossip and talk in the world. That resolution of the Infirmary Board spoke of Dr. Reed's "unremitting zeal," and his share in the management and improvement of the infirmary, as appearing to "admirably qualify him to discharge the duties of an officer of health for the city." If there was one man on the staff of the infirmary who understood Dr. Reed's position and merits in connexion with that institution, it must be the senior physician, Dr. Eason Wilkinson. His testimonial was—"Dr. Reed has shown decided ability, energy, and perseverance in carrying out sanitary matters, and few men have had better opportunities of becoming acquainted with the causes and spread of fever and epidemics. He has invariably been conscientious and unflinching, and I consider his promotion will be a great loss to the institution which he has so greatly served." Besides the testimonials, the committee had a *viva voce* examination of the four gentlemen named. All that had been said as to the standing and position of Mr. Leigh he would heartily subscribe to, if it were a question of appointing him to some office in which consultation was the essential. But a man might be an excellent consulting chemist and medical man, and not have the energy, or the health, or the essential qualities to make an energetic officer of health. It involved no disparagement of Mr. Leigh to prove that Dr. Reed was the right man for the office. Dr. Reed was scarcely in the prime of life, being only thirty-four; and any man who had seen him and observed him would say he was a most active man. Mr. Leigh, at fifty-three, could not be expected to compare with him in that respect; and it was an energetic man that was wanted. In attainments and abilities the testimonials showed that Dr. Reed was, at all events, the equal of Mr. Leigh. The latter had received three or four testimonials from medical men, while Dr. Reed had several from medical men in London, and also seventeen from the very first medical men in Manchester, which showed his position in the medical profession here to be of the very highest. But the argument which seemed to him to be the most unanswerable was that Dr. Reed would devote the whole of his time to the office, whilst Mr. Leigh would not. Mr. Leigh would be serving two distinct authorities, although in the service of the same corporation, because his duties in the gas department were controlled by a distinct committee. He had a medical office in connexion with two or three insurance societies, and although he said these duties would not take up much of his time, the council might judge from their own knowledge of human nature what security they would have, after Mr. Leigh's appointment, that the whole of his mental faculties and energies would be at their command, when his own explanation was that his jurisdiction with regard to the insurance offices extended "from Birmingham to the north." If the council did not appoint Dr. Reed, they would lose the chance of appointing one of the very best men in the country, and they might not have such another chance. It had been objected that Dr. Reed would not stay with them long for £500 a year. That objection involved a very complimentary recognition of Dr. Reed's value; it implied that his services would soon entitle him to a higher salary. Of all ratepayers in the kingdom, those of Manchester were least likely to approve a penny-wise policy. If the council appointed a man who would devote his whole time and energy, unfettered either in mind or body—who was, as Dr. Reed said he was, "untrammelled by any bias whatever"—and gave him £500 a year, they would better prove to the ratepayers their devotion to the true principles of business, in giving a sovereign for a sovereign's worth, than they would by an appointment which should prove their belief that a man could serve two masters and serve them well.

The discussion was continued by Mr. WOODWARD, who thought Mr.

Cooper had some strong feeling against Mr. Leigh. In expressing this opinion, and his intention to support Mr. Leigh's appointment, the speaker was interrupted by cries of "question."

The MAYOR observed that it was not usual to spend much time in the discussion of a personal question.

Alderman NEILD supported the appointment of Dr. Reed. He was not disposed to attach much weight to testimonials, but if those of Dr. Reed and of Mr. Leigh were submitted to any twelve men taken at haphazard, who had never heard of either gentleman before, he believed they would say at once all the weight of the testimonials was on the side of Dr. Reed. As medical officer he was responsible for the whole management of the Infirmary, with certain exceptions. The administration of the house, the control of the patients, the nurses, the medical students, and the servants, of the payment of stores, and of the accounts submitted to the weekly board, and the whole discipline of the institution, were in his hands; and unless he were a man of business and of high character his position would soon bring him into a discreditable collision with others, and under the unfavourable notice of the board. He had seen very little of Dr. Reed, but had heard much of him in connexion with the management of the infirmary, and the testimony was unanimous as to his gentlemanly character, fulness of knowledge, personal vigour, and eminent courage, as he was said to be a man who did not shrink from hard labour or great risk.

Mr. ASHTON was unable to vote according to the recommendations of the Sanitary Committee. Mr. Leigh was a gentleman well acquainted with the city. There was probably not a court, alley, or back street that he did not know of. Years ago Mr. Leigh drew up a map dividing the town into districts, pointing out their respective sanitary conditions, and showing all the fever spots; and he had reported at different times to the Registrar-General information which had been submitted to Parliament. During the cholera visitation Mr. Leigh sat up night after night, in readiness to be called out to visit the poor. There was no question of his merits as a good practical chemist, and such a man was required. A few weeks ago, he (Mr. Ashton) and some other members of the Sanitary Committee visited a cellar in Hulme, where they found three full-grown women and eight young children left in this "baby-farm" whilst their parents were away. The crowding made entrance almost impossible, and inside the stench was abominable. These were the sort of places that accounted for the high death-rate. No doubt Dr. Reed was a man who would attain a very high position in his profession; but this corporation had already in their service, in Mr. Leigh, a man who possessed the requisite experience, whereas Dr. Reed, if appointed, would have to acquire the experience at the expense of the ratepayers.

Mr. ANDERTON was one of those who last September opposed the appointment of an officer of health, believing that more might be effected by buying up unhealthy property and making the requisite improvements; but the appointment being determined upon, he was resolved to favour the best man for the place. He fully believe Mr. Leigh to be a competent man for the place, and he believed Dr. Reed and others to be equally competent. Knowing Mr. Leigh the best, he had been predisposed in that gentleman's favour until he understood that he would not give his whole time to the office. That decided him to support the appointment of Dr. Reed. It was said, some time ago, that Mr. Leigh was willing to give up a private practice, and serve the corporation in this new office, because he wished for a quiet and comfortable position. But that was just what the council did not want. They wanted an active man, who would go round personally to the various districts upon which he was to report. He also preferred Dr. Reed because he was much younger than Mr. Leigh, and equally well qualified. He had also pledged himself not to demand an increase of salary till he had reduced the causes of the death-rate.

Alderman LAMB (who, like the preceding speaker, was much interrupted by cries for the vote to be taken) advocated the appointment of Mr. Leigh. If testimonials had been thought to be necessary, Mr. Leigh would have produced them in overwhelming amount; but he was a man from whom others were accustomed to receive testimonials, instead of his receiving them from others. As to his connexion with the gas-works, it was rather an advantage than otherwise, for his visits to the gas-works compelled him to pass through some of the worst localities of disease.

Alderman BOWKER and others rose to speak, but were unable to proceed, owing to the presistent shouts for the vote.

The MAYOR also reminded the council that they had deputed him to proceed to London that afternoon on the business of the corporation, and he said he did not believe a single vote would be changed by fruitless discussion.

A show of hands was then taken, when there appeared—for Mr. Leigh's appointment, 33 (including the mayor); for Dr. Reed, 27.

The announcement of Mr. Leigh's appointment was much cheered.

The formal resolution was then passed *nem. con.*—"That, as recommended by the committee for general purposes, Mr. Leigh be appointed officer of health, upon the terms and conditions stated in the report submitted."

METROPOLIS GAS SUPPLY.

CITY COURT OF SEWERS, GUILDHALL—TUESDAY, MARCH 10.

At the Meeting of the Commissioners of Sewers, held this day—Deputy DE JERSEY in the chair,

Dr. LETHEBY read his annual report upon the quality of the gas supplied to the City, as follows:—

To the Honourable Commissioners of Sewers of the City of London.

Gentlemen,—I have the honour to submit my report of the illuminating power and chemical quality of the gas supplied to the City of London during the last twelve months.

In the course of that time there have been 2677 examinations of the illuminating power of the gas supplied by the three companies—namely, 897 of the Great Central gas, 890 of the Chartered gas, and 890 of the City Company's gas. The gas has been always tested in accordance with the instructions of the Metropolis Gas Act of 1860, the burner being the 15-hole steatite Argand of Mr. Sugg, which gives, as I have already reported, about 11 per cent. more light than the old brass burner. Each examination, as recorded in the books, is the mean of ten observations; and the following are results for the several quarters of the year:—

ILLUMINATING POWER IN SPERM CANDLES OF 120 GRAINS CONSUMPTION PER HOUR.

1867-8. QUARTERS ENDING	GREAT CENTRAL GAS.				CHARTERED GAS.				CITY COMPANY'S GAS.			
	No. of Experiments.	Max.	Min.	Average.	No. of Experiments.	Max.	Min.	Average.	No. of Experiments.	Max.	Min.	Average.
May, 1867	240	15·64	12·35	13·89	235	15·07	11·63	13·63	235	14·94	11·96	13·45
August, 1867	215	15·38	12·06	13·61	213	16·78	11·91	13·75	213	15·02	11·57	12·98
November, 1867	223	16·52	12·02	13·96	223	16·36	12·57	14·31	223	15·69	12·00	13·75
February, 1868	219	15·47	12·19	14·13	219	15·78	11·85	14·02	219	16·10	11·92	13·72
Year	897	16·52	12·02	13·90	890	16·78	11·63	13·93	890	16·10	11·57	13·48
Yearly average of last 4 years	916	16·48	11·39	13·69	893	16·43	10·04	13·42	894	17·53	11·41	14·01

So that during the year the average illuminating power of the Great Central gas has been equal to that of 13·90 standard sperm candles, the Chartered to 13·93, and the City Company's gas to 13·48 candles, the yearly averages for the preceding four years being 13·69 candles, 13·42, and 14·01 respectively.

The chemical quality of the gas has been subject to great variation; in fact, of 659 experiments that have been made to determine the proportion of sulphu in the gas supplied to the City during the year, there were 263 occasion when the quantity of this impurity was in excess of the amount sanctioned b Parliament. The particulars of these examinations are given in the followin table:—

GRAINS OF SULPHUR IN 100 CUBIC FEET OF GAS.

1867-8. QUARTERS ENDING	GREAT CENTRAL COMPANY.					CHARTERED COMPANY.					CITY COMPANY.				
	No. of Experiments.		Max.	Min.	Average	No. of Experiments.		Max.	Min.	Average	No. of Experiments.		Max.	Min.	Average
	Total.	When in Excess.				Total.	When in Excess.				Total.	When in Excess.			
May, 1867	57	18	26·34	9·71	17·75	56	29	25·53	15·52	20·23	57	2	21·06	5·27	11·58
August, 1867	50	8	25·36	9·04	14·86	50	2	21·65	11·67	16·85	51	21	28·40	9·19	19·00
November, 1867	60	41	34·61	12·74	21·87	61	21	26·30	11·35	18·73	61	42	30·58	14·19	22·97
February, 1868	53	4	23·29	7·43	15·26	52	40	31·96	8·79	22·48	53	35	35·34	11·78	22·68
Year	220	71	34·61	7·43	17·44	219	92	31·96	8·79	19·57	222	100	35·34	9·19	19·06
Average of 4 years	243	202	32·61	15·26	22·46	248	111	30·77	12·61	19·69	243	87	27·62	11·94	18·74

These results show that occasionally for three months together the quantity of sulphur in the gas of each of the companies has been comparatively small, and then for months again it has been excessive. I infer from this that there is great irregularity in the manufacture and purification of the gas. Taking, however, the average of the whole year, the amount of sulphur in the gas has not been in excess of the quantity sanctioned by Parliament; but the fluctuations have been so great that it has ranged in the Great Central gas from 7·43 grains per 100 cubic feet to 34·61 grains; in the Chartered gas from 8·79 to 31·96; and in the City Company's gas from 9·19 grains to 35·34—the averages in the three cases being 17·44, 19·57, and 19·06 grains respectively. It will be observed also that, of the 220 examinations made of the Great Central gas, there were 71 occasions when the quantity of sulphur was more than the Act of Parliament sanctions; of the 219 examinations of the Chartered gas, 92 were in excess of it; and of the 222 of the City Company's gas, 100 were in excess. Altogether, indeed, the failures to comply in this respect with the requirements of the Act of Parliament amounted to nearly 40 per cent.; but in the three preceding years it averaged 56 per cent. There is, therefore, some im-

provement in this particular; and if the present practice of the Great Central Company, in using lime for the purification of the gas, be carefully followed out, as Mr. Hawksley and I have recommended, the quantity of sulphur in the gas will no doubt be kept—as it now is—under the amount sanctioned by Parliament.

The other sulphur impurity—namely, sulphuretted hydrogen—has always been absent from the gas of each of the companies; but as regards ammonia, the proportion has constantly been excessive in the Chartered gas, and occasionally so in the Great Central.

The pressure at which the gas of the several companies has been delivered has ranged from an inch of water to 3 inches, the average being about 1·3 for the Chartered, 1·5 for the Great Central, and 1·6 for the City Company's gas.—I remain, gentlemen, your obedient servant,

HY. LETHEBY.

Guildhall, March 10, 1868.

DR. HILLIER'S REPORT ON THE GAS SUPPLIED BY THE IMPERIAL COMPANY TO THE VESTRY OF ST. PANCRAS DURING THE MONTH OF FEBRUARY, 1868:—

Date.	Number of Observations.	Average Light in Candles produced by 5 Ft. of Gas per Hour.	Light in Candles reduced to Consumption of 120 Grs. per Hour.	Traces of Ammonia.	Traces of Sulphuretted Hydrogen.
Feb.					
4	10	12·25	12·9	Yes.	No.
5	10	13·0	13·0	,,	,,
7	10	13·4	13·4	Faint.	,,
11	10	13·4	14·7	Yes.	,,
12	10	14·0	14·0	,,	,,
14	10	13·7	13·7	,,	,,
18	10	12·7	13·9	,,	,,
19	10	12·6	14·4	,,	,,
21	..	...	...	,,	,,
26	10	13·6	13·6	Faint.	,,
27	10	13·0	13·0	Yes.	,,
28	10	13·0	14·3	,,	,,

In 100 cubic feet of gas there was found 10·05 grains of sulphur on one occasion, and 16·7 grains on another. The illuminating power of the gas varied from 12·9 to 14·7 candles. The mean of all the observations was 13·6. The Act was not infringed with reference to sulphur, but, as usual, the limit prescribed as regards ammonia was not observed.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE GAS SUPPLIED IN ST. MARYLEBONE, IN FEBRUARY, 1868:—

February.	Illuminating Power in Sperm Candles.			Mean Pressure in 10ths of an inch.		Mean Amount of Sulphur in 100 Cub. Ft.
	*Mean of 27 Observations.	Highest.	Lowest.	Highest.	Lowest.	
Imperial Co.'s gas . .	15·51	16·26	14·51	23·48	9·83	19·41
Chartered Co.'s common gas . . .	13·34	14·26	12·67	37·00	13·46	29·77
Chartered Co.'s cannel gas	20·89	22·05	20·10	34·61	12·76	19·51

* Each observation consists of 10 readings of the photometer.

The mean illuminating power of the Imperial Company's gas has been equal during the month to 15½ sperm candles, or rather more than 29 per cent. higher than what is required by law. Four times it exceeded 16 candles, and on no occasion did it fall below 14½ candles. The pressure was satisfactory; and, as regards purity, sulphuretted hydrogen was never detected, but sulphur, in the form of bisulphide of carbon, was found to exist to the extent of rather more than 19 grains in every 100 cubic feet of gas, being a little below the quantity permitted by Act of Parliament. The test-paper for ammonia usually detected the presence of that impurity. The common gas of the Chartered Company gave a mean light during the month equal to rather more than 13 candles, or about 11 per cent. in excess of the standard; on five occasions it exceeded 14 candles, and on six occasions only did it fall below 13 candles. The excess of sulphur in this gas still continues very considerable, and cannot fail to be injurious to the health and comfort of those who burn it in their dwelling-houses. No sulphuretted hydrogen was detected, but traces of ammonia were usually observed. The pressure was uniformly good. The mean light of the cannel gas was nearly a candle in excess of the standard, and on no occasion did it fall below the standard. The pressure was good, and, as regards purity, the sulphur contained in it did not exceed what is permitted by law. The above results were obtained from the gas manufactured by the Imperial Company, at their Fulham works, and from the common and cannel gas of the Chartered Company, at their works in the Horseferry Road, Westminster.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE WATER SUPPLIED IN ST. MARYLEBONE, IN FEBRUARY, 1868:—

February.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by Incineration of Solid Matter in previous column.		Ammonia.
	Feb., 1867. 0°	Feb., 1868. 0°	Feb., 1867. 0°	Feb., 1868. 0°	0°
Distilled Water . . .					
West Middlesex water	20·44	20·64	0·72	0·64	—
Grand Junction water	20·48	21·16	0·84	0·76	—

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

DR. FRANKLAND'S ANALYSIS OF THE METROPOLITAN WATERS IN FEBRUARY, 1868.—"Royal College of Chemistry, Feb. 29, 1868.—Sir,—I have the honour to submit to you in the following table the results of the chemical examination of the waters supplied to the metropolis during the month of February. For the purpose of comparison I append also the results yielded by Loch Katrine water, as supplied to Glasgow, and by the waters supplied to the towns of Lancaster, Manchester, Leicester, Preston, and Worthing, when submitted to the same analytical processes. The waters delivered by the New River, East London, and Kent Companies were clear and transparent, but, with the exception of the West Middlesex, all the companies drawing their supply from the Thames were delivering imperfectly filtered water on the day when the samples were taken. The Lambeth Company's water was so muddy that brightly illuminated objects could not be seen through a stratum of it 12 inches deep. The Chelsea Company's water was but little better in this respect, and the supply of both companies was, on this ground alone, entirely unfit for domestic use. The water delivered by the Southwark and Grand Junction Companies was only slightly turbid. The organic matter contained in all the samples of water, except those of the West Middlesex and Southwark Companies, was highly nitrogenized, and therefore probably of animal origin to a considerable extent. The condition of the Kent Company's water delivered at the Deptford Railway Station, on the 7th inst., presented remarkable peculiarities. It contained the very large amount of 59·2 parts of solid impurity in 100,000 parts of the water, 42 parts being the maximum and 39·3 the mean amount observed in this company's water during the year 1867. Of the above 59·2 parts no less than 14·7 were common salt, the occurrence of which in such quantity is difficult to account for, except on the supposition that the company's wells have some connexion either with the sea or the brackish reaches of the Thames. The previous sewage contamination was also higher than that observed on any former occasion. For the first time since February, 1867, the East London Company's water exceeds that of the New River Company in previous sewage contamination.

Companies.	Date and Place of Collection.	Temperature in Cent. Degrees.	Total Solid Impurity in 100,000 Parts.	Organic Carbon.	Organic Nitrogen.	Nitrogen, as Nitrates and Nitrites.	Ammonia.	Total combined Nitrogen.	Previous Sewage Contamination (Estimated).	Total Hardness.
Thames.		Cent.								
Chelsea.....	Feb. 4—Cab Rank, Horse Guards ..	7·2	30·8	·326	·052	·340	·002	·394*	3100	18·8
West Middlesex	Feb. 4—Cab Rank, Portland Road ..	7·2	30·0	·357	·031	·321	·002	·354	2910	18·4
Southwark & Vauxhall ..	Feb. 4 — Barclay's Brewery	7·7	32·2	·324	·032	·344	·001	·377	3130	19·7
Grand Junction.....	Feb. 4—Cab Rank, Woodstock St...	5·8	32·6	·329	·055	·343	·001	·399	3120	21·1
Lambeth	Feb. 4—Cab Rank, Lambeth Road..	7·2	31·2	·360	·045	·310	·001	·356	2790	18·5
Other Sources										
New River...	Feb. 4—Cab Rank, Tottenham Ct. Rd.	6·6	30·8	·217	·026	·355	·001	·382	3240	20·5
East London.	Feb. 5 — Slater's, Old Ford Road .	7·2	34·4	·272	·037	·370	·003	·410	3400	20·5
Kent.....	Feb. 7 — Deptford Railway Station.	11·6	59·2	·081	·013	·564	·001	·578	5330	30·0
Loch Katrine	Feb.,1867, Glasgow		3·28	·256	·008	·031	·002	·041	0	0·3
Lancaster ...	Sept.—Lancaster .		3·54	·157	·001	·036	·001	·038	50	0·1
Manchester..	Nov.—Manchester		6·8	·242	·026	·001	·001	·028	0	2·7
Leicester	Nov.—Leicester ..		23·7	·506	·020	·001	·001	·022	0	13·4
Preston	Dec.—Preston		14·7	·515	·040	·001	·003	·044	0	6·7
Worthing ...	Nov.—Worthing ..		36·7	·162	·000	·426	·000	·426	3940	23·8
Column 1	2	3	4	5	6	7	8	9	10	11

* In the last month's report, through a clerical error, the total combined nitrogen in the Chelsea Company's water was given as ·339, instead of ·398.

The numbers in columns 4, 5, 6, 7, 8, 9, 10, and 11 all relate to 100,000 parts of the waters. The table is to be read thus: The Chelsea Company's water collected on Feb. 4, at the Horse Guards cab rank, had a temperature of 7·2° Cent.; 100,000 lbs. of it contained 30·8 lbs. of solid impurity; the organic matter, constituting a portion of this impurity, contained ·326 lb. of carbon and ·052 lb. of nitrogen. This solid impurity also contained ·340 lb. of nitrogen in the form of nitrates and nitrites, besides ·002 lb. of ammonia; whilst the total amount of *combined* nitrogen in every form was ·394 lb. The above quantity of water supplied by the Chelsea Company had been, after its descent to the earth as rain, contaminated with sewage or manure matter equivalent to 3100 lbs. of average filtered London sewage. By gradual oxidation, partly in the pores of the soil, partly in the Thames and its tributaries, and partly in the reservoirs, filters, and conduits of the company, this sewage contamination had been converted into innocuous inorganic compounds before its delivery to consumers. Finally, 100,000 lbs. of the Chelsea Company's water contained 18·8 lbs. of carbonate of lime, or an equivalent quantity of other soap-destroying ingredients.—I have, &c., E. FRANKLAND.—The Registrar-General, &c.

AVERAGE COMPOSITION AND QUALITY OF THE METROPOLITAN WATERS IN FEBRUARY, 1868.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

Names of Water Companies.	Total Solid Matter per Gallon.	Loss by Ignition.*	Oxidizable Organic Matter.†	Hardness.		Organic and other Ammonia.
				Before Boiling.	After Boiling.	
Thames Water Comps.	Grs.	Grs.	Grs.	Degs.	Degs.	Grs.
Grand Junction. . . .	..	..	..	..	..	..
West Middlesex . . .	20·83	1·25	0·93	13·0	3·0	0·010
Southwark and Vauxhall.	22·81	2·50	1·13	13·5	3·5	0·015
Chelsea	22·50	2·50	1·44	13·5	3·5	0·015
Lambeth	21·83	1·75	1·14	13·5	3·5	0·015
Other Companies.						
Kent	27·90	1·75	0·04	17·5	6·0	0·008
New River	20·83	1·25	0·58	12·5	3·0	0·008
East London.	23·27	1·25	0·86	14·0	4·5	0·008

* The loss by ignition represents a variety of volatile matters, as well as organic matter, as ammoniacal salts, moisture, and the volatile constituents of nitrates and nitrites.

† The oxidizable organic matter is determined by a standard solution of permanganate of potash—the available oxygen of which is to the organic matter as 1 is to 8; and the results are controlled by the examination of the colour of the water when seen through a glass tube 2 feet in length and 2 inches in diameter.

The water of the Lambeth Company was turbid.—H. LETHEBY, M.B.

LONGTON GAS COMPANY.—The half-yearly meeting of this company was held on Thursday, the 27th of February, in the afternoon, at the company's offices on the works—Mr. W. Webberley in the chair. The secretary and engineer (Mr. John Obren) read the notice convening the meeting and the directors report for the past half year, with statement of accounts annexed.

The directors in their report stated that the operations of the company for the past year had been satisfactory, and that the plant and works were in an efficient state, and the whole of the gas to the town and district was now being supplied from the company's new works. The balance-sheet for the half year to the 31st of December last showed that the profits for the half year were £562 4s. 9d., which together with the balance of £269 2s., unappropriated from last account, amounted to £831 6s. 9d. Out of this sum the directors recommended the declaration of a dividend at the rate of 6 per cent. per annum, free of income-tax, the balance of £208 19s. 6d. to be carried to the next account. The chairman, in moving the adoption of the report, stated that he considered the dividend very satisfactory, considering that they had had to purchase the mains and goodwill of the late competing company, in addition to the necessary outlay for the new works for the manufacture of the gas. He would also remind the meeting that their works had been erected, on the recommendation of their engineer, of sufficient magnitude to enable them to meet the probable increase of consumption for the next 15 years, so that there must necessarily be a portion of the capital that would not be immediately remunerative. Taking these things into consideration, he felt assured that the shareholders would consider 6 per cent. a good dividend. The report was received and adopted. Mr. F. H. Hawley the retiring auditor was re-elected. A cordial vote of thanks was awarded to the directors for their exertions during the past half year, and the meeting was brought to a close with a vote of thanks to the chairman for presiding.

HEALTH OFFICER FOR MANCHESTER.—Manchester has at last got an officer of health. The necessity for the appointment has long been apparent to the whole country; we only wish we could now congratulate ourselves on the mode in which the office has been filled up. But, to be candid, we can do nothing of the kind. There is a taint of suspicion about the whole business, which not even the candour and eloquence of Mr. Alderman Rumney can effectually remove. The facts of the case are too notorious to admit of any concealment. When the question of the appointment of an officer of health came before the council some months ago, it was only too evident that many of the members—if not an actual majority—were totally opposed to the proposal. Something, however, was due to public opinion, which, in this matter, was decidedly above the dead level of corporate notions, and it was, therefore, deemed desirable to make a pretence of prosecuting further inquiry. In a happy moment the discovery was made that, if an officer of health was inevitable, a good deal might be gained by appointing one to the post who might be kept largely under the control of the coy and reluctant corporation. Appearances would thereby be saved, while things might possibly be permitted to run on in the old obnoxious style. Mr. Leigh, who was yesterday elected to this new and important office, has long held two other public appointments. We have no wish to say a word in dispraise either of his capacity or his honesty, but we assert without hesitation that the officer of health for a city like Manchester should be untrammelled by any other duties and responsibilities, and that he should be in other respects independent of the body to whom he owes his election. Mr. Leigh fulfils neither of these vital conditions. It would be a strong objection to him were his two prior appointments entirely unconnected with the corporation; but, seeing that he has long been the servant of the Gas Committee, we maintain that he is wholly untitted to satisfy the public requirements in his new office. We say nothing of the relative claims of Dr. Reed further than this, that they were of a kind and degree which made them unimpeachable, and that in his person the bitterest opposition must have speedily been disarmed. We protest against Mr. Leigh's appointment solely on public grounds. We believe we interpret correctly the wishes of our citizens when we declare that their desire was and is that their officer of health should be a gentleman in all respects competent to the discharge of the onerous and delicate duties which will devolve upon him, and, above and beyond all else, that he should be free from the faintest imputation of control on the part of the corporation. However zealously and ably Mr. Leigh may henceforth acquit himself, he will be perpetually open to the imputation of not being an absolutely free agent, and we need not say that this suspicion will be positively fatal to his official reputation.—*Manchester Examiner and Times.*

BRIGHTON AND HOVE GENERAL GAS COMPANY.

Dr. *Profit and Loss, Year ending Dec. 31, 1867.* *Cr.*

To Coals			£16,845	18	4		
Purifying materials and process			236	3	3		
Repair and maintenance of meters, mains, service-pipes, and other works			2,439	10	6		
Wages			5,457	17	4		
Lamps—providing, lighting, extinguishing, cleaning, and repairing			547	2	2		
Rent, rates, and taxes			655	19	6		
Salaries, collectors commissions, and payments to directors			2,102	8	7		
Interest on loans			1,168	0	4		
Professional charges and incidental expenses			350	9	2		
Estimated discounts and bad debts on rental			252	15	10		
Half per cent. on cost of works, June 30, 1867, for depreciation			628	0	0		
Dividend paid to proprietors—4½ per cent. on £100,000 capital, raised under Act Vict. 2, c. 38	£4,500	0 0					
Dividend paid to proprietors—4½ per cent. on £5050 capital raised under Act Vict. 29, c. 184	102	13 0					
			4,602	13	0		
Miscellaneous payments—							
Amount carried to reserve-fund			28	11	4		
Balance carried to next year's account			3,469	3	5		
			£38,784	12	9		

By Balance brought from last year's account			£2,290	17	0		
Reserve-fund			222	17	2		
Sale of gas			29,388	4	7		
Coke and breeze			6,380	19	0		
Tar and other residuals			501	15	0		
						£38,784	12 9

Dr. *Balance-Sheet, Year ending Dec. 31, 1867.* *Cr.*

To Capital raised—							
Under Act Vict. 2, c. 38	£100,000	0 0					
Ditto ditto 29, c. 184	5,050	0 0					
			£105,050	0	0		
Amount of loans			25,000	0	0		
Reserve-fund			1,686	8	1½		
Amount owing by the company			11,806	9	9		
Unclaimed dividends			46	9	0		
Balance as above			3,469	3	5		
			£147,058	10	3½		

By Cost of works			£124,035	3	11½		
Ditto (add extensions made during the year)			1,935	19	9		
						£125,971	3 8½
Amount invested of the reserve-fund						1,567	15 0
Calls unpaid						25	0 0
Amount owing to the company for gas, coke, residual products, fittings, &c., exclusive of estimated bad debts						14,242	4 7
Coals in stock						3,015	9 10
Residual products and other stocks						1,644	4 0
Cash in hands of treasurer, cashier, &c.						592	13 2
						£147,058	10 3½

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum	Price per Share.
	£		£ s d	£ s d	£ s d
8000	10	Anglo-Romano	10 0 0	9 0 0	11 to 12
5000	20	Bahia (Limited)	20 0 0	nil.	
1000	20	Do., preference	20 0 0	10 0 0	27 10 0
1750	20	Do., do., redeemable	10 0 0	10 0 0	12 10 0
40000	5	Bombay (Limited)	5 0 0	5 0 0	4 to 4½
10000	5	Do., third issue	3 0 0	5 0 0	2 to 2½
10000	20	British, Limited (Norwich, Huilsculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	6 0 0	28 to 29
12000	50	*Chartered*	50 0 0	6 10 0	44 to 45
6000	50	Do.	40 0 0	6 10 0	34 to 35
10000	20	*City of London*, A shares	20 0 0	9 0 0	22 to 23
10000	10	Do., B shares	10 0 0	4 0 0	6½ to 6¾
9629	10	Do., new shares	10 0 0	9 0 0	11 to 11½
25000	25	City of Moscow (Limited)	25 0 0		8½ to 9
17490	25	*Commercial*	25 0 0	10 0 0	32 to 33
20000	20	Continental Union	20 0 0	4 0 0	14 to 15
10000	20	Do., preference	20 0 0	7 0 0	20 to 20½
5000	10	*Crystal Palace District*	10 0 0	10 0 0	13½ to 14
5000	10	Do., preference	10 0 0	6 0 0	12½ to 13
10000	10	Do., new shares	2 10 0	7 0 0	2½ to 3
4000	50	*Equitable*	50 0 0	10 0 0	63 to 65
4000	25	Do., new shares	25 0 0	10 0 0	32 to 33
23406	10	European (Lim.)	10 0 0	10 0 0	13 to 13½
12000	10	Do., new shares	5 0 0	10 0 0	7 to 7½
		Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)			
20000	10	*Great Central Gas Consumers*	10 0 0	10 0 0	13 to 13½
5000	10	Hong Kong (Lim.)	10 0 0	5 0 0	8 to 10
26000	50	*Imperial*	50 0 0	10 0 0	62 to 63
1300	100	Do., bonds	£100	10 0 0	170 to 175
28000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	95 to 96
400	100	Impl. Mexican (L.)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	50 to 53
3000	10	Do.	10 0 0	5 0 0	7 to 9
3000	20	Do.	12 10 0	7 10 0	13 to 14
7133	50	*London*	50 0 0	10 0 0	63 to 64
5610	25	Do., 1st pref.	25 0 0	6 0 0	25 to 27
503	50	Do., 2nd pref.	50 0 0	6 0 0	
214	50	Do., 3rd pref.	50 0 0	6 0 0	
18781		Do., 1st pref. sk		6 0 0	
11828		Do., 2nd pref. sk		5 0 0	
12000	5	Malta & Medit. (L.)	5 0 0	4 0 0	3¼ to 4
6000	5	Do., preference	5 0 0	7 0 0	5 0 0
30000	5	Oriental, Calcutta	5 0 0	9 0 0	6¾ to 7
30000	5	Do., new shares	1 0 3	9 0 0	1¼ to 1½
10000	5	Ottoman (Limited)	5 0 0	nil.	1½ to 2¼
10000	10	Park (Limited)	10 0 0	6 0 0	8½ to 9
27000	20	*Phœnix*	20 0 0	10 0 0	25 to 26
3600	100	Do., new	35 0 0	7 10 0	35 to 36
144000	Sk.	Do.	100 0 0	5 0 0	71 to 73
5000	20	*Ratcliff*	20 0 0	10 0 0	22 to 24
	20	Rio de Janeiro (L.)	20 0 0	10 0 0	22 to 23
6959	5	Singapore (Lim.)	5 0 0	3 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
		Shanghai			
4800	50	*Sth. Metropolitan*	50 0 0	10 0 0	70 to 71
15000	10	*Surrey Consumers*	10 0 0	9 0 0	12¾ to 13¾
10000	10	Do., new	6 0 0	9 0 0	7½ to 8
9000	4	United General (Limerick)	4 0 0		2 to 2½
10000	10	*Victoria Docks*	5 0 0	6 0 0	
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	10 0 0
2989	10	Do.	10 0 0	7 10 0	
316	10	Do.	6 10 0	7 10 0	
1128	10	Do.	3 0 0	7 10 0	
20000	10	Western (Limited), A shares	10 0 0	10 0 0	14 to 14½
10000	10	Do., B shares	5 0 0	10 0 0	7½ to 8
10000	10	Do., C shares	5 0 0	10 0 0	6¾ to 7
20000	10	Do., D shares	1 0 0	10 0 0	1½ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares	3 0 0	7 10 0	3 18 0
551	10	W. Lon. Junc. (L.)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 12 6	2 12 9	2 7 6	3 5 0	3 5 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¾ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

Haswells, Nettlesworth Primrose, and South Pelaw	7s. 6d.
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	7 9
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton.	8 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	8 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	8 6
Ramsay's Newcastle Cannel	15 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	42 6
Muirkirk	27 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Cowdenbeath	12 0
Lesmahago (at Glasgow)	31 6
Ditto (at Granton)	31 6
Arniston	27 6
Wemyss	27 6
Haywood, Wilsontown (at Granton)	23 0
Pirnie, or Methill	17 0
Lothian's Cannel (at Leith)	28 0
Myles' Cannel	23 6
Lochore Parrot (at Burntisland)	28 0
Lanemark (at Glasgow)	16 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	6s. 3d. to 6 0
Cork	9s. to 9 6
Dover, Folkestne, & Ramsgate	7 0
Dublin	9s. 6d. to 10 0
Exeter Quay	8 6
Ipswich	5 6
London (from Leith)	9 0
London (Pool)	6s. to 6 3
Lowestoft and Yarmouth	5s. 3d. to 5 6
Portsmouth & Southampton	8 0
Plymouth	7 6
Shoreham	7 6
Whitstable	7 0
Weymouth	8 0
Foreign.—Per Keel:—	
Barcelona	£18 5
Bordeaux	14 0
Boulogne and Calais	7 10
Cadiz	13 0
Cronstadt	—
Copenhagen	11 10
Genoa	18 0
Hamburg	11 0
Havre de Grace	8 10
Leghorn	17 0
Lisbon	12 0
Rotterdam	11 0
Stettin	9 10
Trieste	12 0
Venice	16 0

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to	£2 15 0
Cliff's Fire-bks. (at Wortley), p. 1000	2 15 0
Ingham's ditto (at Wortley), p. 1000	2 15 6
Fire-clay Retorts, p. ft. run, 8s. 6d. to	0 7 0
Tough Cake Copper, p. ton	76 0 0
English Pig Lead, p. ton	19 0 0
Welsh Bar Iron (in London), p. ton	6 5 0
Foreign Spelter, p. ton	20 5 0
English Block Tin, p. ton	96 0 0
Banca, p. ton	93 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

THE LONDON & WESTMINSTER METER COMPANY, LIMITED.

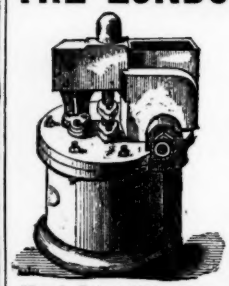
PATENTEES AND SOLE MANUFACTURERS OF

THE ABC GAS-METER.

EDGE'S PATENT INDEX.

MYERS'S PATENT WATER-METER.

(A CYLINDER and PISTON.)



Myers's Patent Water-Meter.

The ABC GAS-METER shows in plain figures the money payable for Gas consumed, at well as the number of cubic feet.

A B C Gas-Meter.

MYERS'S WATER-METER is accurate in measurement, simple in action, and moderate in price.

Manufacturers of the ordinary Wet and Dry Meters, Governors, Photometers, and all other Gas and Water Apparatus.

JOHNSON'S PLACE, LUPUS STREET, LONDON, S.W.

CITY OFFICE: 2, CASTLE COURT, BIRCHIN LANE, E.C.

JOHN VICKARY,

GAS ENGINEER AND CONTRACTOR, IRON AND BRASS FOUNDER,

WORKS—EXE ISLAND, EXETER,

Tenders his best thanks to the various Gas Companies in **England, Ireland, and Wales,** for the very liberal and kind support he has received for the last **22 years,** during which period he has erected and extended above **200 Gas-Works.**

In addition to the numerous towns wherein he has been engaged, he begs reference to the following testimonial:—

Plymouth and Stonehouse Gaslight and Coke Company.

Sir,—I have much pleasure in testifying that the 100-foot Telescope Gasholder and Cast-Iron Tank, erected by you for this Company in 1862, has given the highest satisfaction, and never required the slightest attention or adjustment since its completion.

(Signed) PETER ADAMS, Chairman.

He has also erected a 100-foot Gasholder and Cast-Iron Tank at **Exeter;** an 80-foot Telescope Gasholder and Iron Tank at **Devonport;** a 90-foot at **Torquay,** &c. &c. At either of those works satisfactory references can be made.

He also begs particular attention to his **Improved Gas-Meters,** either **Wet, Dry, or Compensating,** the materials and workmanship of which guaranteed of the very best description, and which has gained for his Meters so excellent a reputation for these last **20 years.**

RETORTS, DIP & ASCENSION PIPES, HYDRAULIC MAIN, CONDENSERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, and GASHOLDERS,

Of any size, and every description of article required in Gas-Works.

Mains, Tees, Connexions, and Syphons, from 2 to 12 in., always in stock, and supplied at Scotch prices.

Clay Retorts and Fire-Goods of every description.

Gas-Fittings of the most modern designs.

Iron Pipe and Fittings, Service Cocks, &c.

Plans, Specifications, and Estimate for the erection of New Gas-Works of any size furnished.

SECRETARY & MANAGER.

WANTED, by the Redhill Gas Company, an active Gentleman to undertake the office of SECRETARY and MANAGER. Must be fully conversant with the manufacture and distribution of Gas, and every detail connected with the business; also competent to keep books by double entry, and able to devote his whole time to the Company. Salary £150 per annum. Security will be required.

Address, stating age and last engagement, to W. STENNING, Esq., Chairman, Redhill, SURREY.

N.B.—Canvassing of Directors strictly prohibited.

TO GAS COMPANIES.

WANTED, by the Advertiser, a situation as WORKING MANAGER. Has been in the same position for 13 years to one Company. Thoroughly understands the manufacture of Gas, main and service laying, and the repairing of meters; also of gas-fittings generally. Can have first-class reference from the Company to whom he has been manager. Age 40 years.

Address T. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, an active, sober Man to undertake the entire MANAGEMENT of a village Gas-Work. He must be able to lay services and fix meters.

Apply by letter, stating wages, and giving reference to last situation, to Mr. ROWE, Earl Shilton, Hinckley, LEICESTERSHIRE.

WANTED, by the Advertiser, a situation as METER INSPECTOR. First-rate testimonials.

Address ALPHA, 246, Caledonian Road, ISLINGTON.

TO GAS COMPANIES.

WANTED, a situation as Gas MANAGER by the Advertiser. Aged 34. Has had 16 years experience in the office of a large Gas-Work as Chief Clerk and Secretary. Is a good draughtsman, thoroughly understands gas apparatus, and has had superintendence of gas-making, main-laying, and the general management of Works. Unexceptionable references and testimonials.

Address W. W., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a young Man, a situation as GAS and METER FITTER, &c. Can show good testimonials if required.

Address C. S., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a re-engagement as WORKING MANAGER of a Gas-Work. Perfectly understands the making and distribution of gas, retort-setting, main and service laying. Can read meter indices, and do all necessary repairs for a Gas-Work. Good references can be given as to character and ability.

Address W. S., No. 6, Town Road, Edmonton, MIDDLESEX.

TO GAS COMPANIES.

A Manager of 15 years experience is desirous of a re-engagement in a similar capacity, or as Manager and Secretary.

Address X., Messrs. Marlborough and Co., Ave Maria Lane, LONDON.

NOTICE.

THE Town Council of Northampton is about to appoint an INSPECTOR of Gas-Meters, under the Act of 22nd and 23rd Vic., cap. 66. Salary £100 per annum.

Persons desirous of being appointed to the office will, before the 2nd of April next, sent a written application, accompanied with testimonials of fitness, addressed to the Town-Clerk, Northampton, sealed up and endorsed "Gas Inspector."

By order,
JOHN JEFFERY, Town-Clerk.

Town Hall, March 3, 1868.

PURIFIERS FOR SALE.

THE Holyhead Gas Company have FOR SALE Two Dry-Lime PURIFIERS, each 8 ft. long, 4 ft. wide, 3 ft. 6 in. deep, with wood sieves and connexion, wrought-iron covers, and lifting apparatus complete. In excellent condition, and are to be sold because the Company have procured others of double their size. JOHN ROBERTS, Manager.

Gas-Works, Holyhead, March 11, 1868.

TO GAS COMPANIES & OTHERS.

THE Evesham Gaslight and Coke Company have an excellent GASHOLDER, 30 ft. diameter and 10 ft. in depth, FOR SALE on moderate terms.

Application to be made to, and tenders received by Mr. DAY, the Bank, EVESHAM.

GASHOLDER FOR SALE.

ONE, 40 ft. diameter and 16 ft. deep; Four, 40 ft. diameter and 13 ft. deep; One, 28 ft. diameter and 8 ft. deep. All quite new.

For particulars apply to THOS. PIGGOTT & SON, Swallow Foundry, Spring Hill, BIRMINGHAM.

TO GAS COMPANIES.

FOR Prices of Gas Coal, Cannel, PIPES, RETORTS, and FIRE-BRICKS, apply to ALPHEUS SMITH, DERBY.

SOUTH METROPOLITAN GAS-LIGHT AND COKE COMPANY.

NOTICE is hereby given that an ORDINARY MEETING of the PROPRIETORS of this Company will be held at the London Tavern, in the City of London, on MONDAY, the 6th day of April next, at Two o'clock precisely, to receive the Directors Report, and the Accounts of the Company for the half year ended December 31 last, to declare a Dividend, and to elect a Director in place of Beriah Drew, Esq., and an Auditor in place of Frederic Simpson, Esq., who retire from office at this meeting, but, being eligible, offer themselves for re-election.

Any Proprietor holding 40 shares, intending to become a candidate for either of these Offices, must give notice in writing at the Office of the Company, at least 14 days previously to the day of election.

By order of the Directors,
THOMAS LIVESEY, Secretary.

Old Kent Road, March 14, 1868.

CRYSTAL PALACE DISTRICT GAS COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY GENERAL MEETING of the SHAREHOLDERS of this Company will be held at the City Terminus Hotel, Cannon Street, in the City of London, on THURSDAY, the 26th inst., to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, to declare a Dividend, and for general business.

The Chair will be taken at half-past Three o'clock precisely.

By order of the Board,
MAGNUS OHREN, Secretary.

Offices, Lower Sydenham, S.E., March 6, 1868.

COMMERCIAL GAS COMPANY.—NOTICE is hereby given that the next ORDINARY MEETING of the Company, will be held at the London Tavern, Bishopsgate Street, in the City of London, on FRIDAY, the 3rd day of April next, at Twelve o'clock at Noon, to receive the Report of the Directors, and to declare a Dividend to the 31st day of December last.

The following Directors—viz., James Holbert Wilson, Thomas Brushfield, and Alexander Thomas Laport, Esqrs.—will go out of office by rotation, who, being eligible for re-election, offer themselves accordingly; and the Board of Directors unanimously recommend those gentlemen to the Proprietors for re-election. Edward Marsh, Esq., Auditor, will go out of office by rotation, who, being eligible, has given notice of his intention to offer himself for re-election.

The Books of the Company will be closed for the Transfer of Shares from the 20th day of March to the 3rd day of April, now next ensuing.

By the Company's Act of Incorporation, Shareholders can inspect the Books of the Company during one fortnight before and one month after the Meeting.

By order of the Board,
GEORGE JAQUES, Secretary.

Stepney, March 13, 1868.

OLD GAS PLANT FOR SALE.

THE Banbury Gas Company have for disposal 30 3-in. Dip-Pipes, 30 H-Pipes, with caps fitted; also 6 lengths of 14-in. Circular Hydraulic Main.

The above will be sold in one or several lots, and at a very reasonable price.

By order,
W. R. COOPER, Secretary.

Banbury, Feb. 26, 1868.

WHITWORTH VALE GAS COMPANY.

THE Directors of the above Company invite TENDERS for the supply of about 700 yards of 12-in. Cast-Iron SOCKET-PIPES, turned and bored, with Three Branches for same, the whole to be tested to 30 lb. on the square inch, and coated with coal tar while hot. The average weight per yard to be 200 lbs.

Tenders, which must state the price per cwt. delivered at the Rochdale Railway Station or Whitworth, to be delivered to the undersigned not later than Saturday, the 21st day of March next.

CHARLES LORD, Manager.

Whitworth, Feb. 15, 1868.

GAS TAR & AMMONIACAL LIQUOR.

THE Directors of the Rugby Gas and Coke Company invite TENDERS from persons willing to contract with them for their surplus TAR and LIQUOR for not exceeding three years from the 25th inst. The above to be delivered to the Contractor at the Gas-Works, and each tender to state the term for which the same is made, and price for both articles or either. Tenders to be sent in under cover to me, marked "Tender for Tar," on or before the 3rd of April next.

The Directors do not bind themselves to accept any tender. PETER SIMPSON, Superintendent.

Rugby, March 2, 1868.

TO ENGINEERS & IRONFOUNDERS.

THE Directors of the Warrington Gaslight and Coke Company are prepared to receive TENDERS for a set of FOUR PURIFIERS, 12 ft. square, with centre-valve, covers, and hoisting apparatus, in conformity with plans and specifications, to be seen at the Offices of the Company.

Sealed tenders, addressed to BENJAMIN PIERPOINT, Esq., Chairman of Directors, St. Austin's, WARRINGTON, must be sent in not later than Thursday, the 19th day of March next.

The Directors do not bind themselves to accept the lowest or any tender.

JAMES PATERSON, Engineer.

Gas Company's Office, Warrington,
Feb. 24, 1868.

TO GAS ENGINEERS.

THE Directors of the Kingsbridge Gas Company are desirous of receiving TENDERS for supplying the necessary materials for and constructing during the ensuing summer a range of Four Beds of RETORTS; two of the Beds or Ovens to be capable of receiving a bench of five Retorts each, and the other two capable of receiving three Retorts each.

Two of the benches of Retorts to be fixed in place ready for work—viz., one of five, and one of three. The Retorts to be of clay. The contract to include the chimney, all the masonry and brickwork, the stays or braces and tie-plates to masonry and brickwork, the hydraulic main, stand, dip, and all other pipes, condensers, valves and purifiers, and all the necessary apparatus, free of freight and carriage, for making, purifying, and conveying the gas that may be made by at least ten Retorts in full work at the same time to the inlet of the existing gasholder, which is about 70 ft. in a direct line from the wall against which the back of the Retorts is intended to be placed.

The work must be completed, ready for making gas, on or before the 1st day of September next.

Sealed tenders, endorsed "Tender for Gas-Work," to be sent not later than Monday, the 20th day of April proximo, to the Secretary of the Gas Company, Kingsbridge, Devon, of whom any further information may be obtained.

The Directors do not pledge themselves to accept the lowest or any tender.

By order of the Directors,
W. JARVIS, Secretary.

Kingsbridge, March 11, 1868.

COKE BREEZE.

THE Directors of the Imperial Gas Company are ready to receive TENDERS from parties willing to purchase the BREEZE made at their several Works—viz., at York Road, King's Cross, Great Cambridge Street, Hackney Road, and Sands End, Fulham, for One year from the 31st inst.

Forms of tender may be obtained on application to the SECRETARY, at the Office, No. 33, John Street, BEDFORD ROW, to whom the tenders must be sent on or before Tuesday, the 24th inst.

The Directors will not be bound to accept the highest or any tender.

March 13, 1868.

TO GASHOLDER MAKERS.

THE Directors of the Whitstable Gas Company are desirous of receiving, on or before the 2nd of April, TENDERS for the erection of a GASHOLDER, 40 ft. diameter and 16 ft. deep, with six columns and girders, 6-in. inlet and outlet pipes, valves, and all connexions complete. Also for the supply and erection of One PURIFIER, 6 ft. by 6 ft. by 3 ft., with three tiers of sieves, two four-way valves, and connexions, fitted complete at their Works at Whitstable.

Sealed tenders to be forwarded to R. DARNEY, FAVERSHAM, of whom all particulars may be obtained.

Any or all of the tenders may be rejected at the option of the Directors.

EAST BARNET GAS & WATER COMPANY.

GASHOLDER & BRICK TANK.

TENDERS are required by the Directors of the East Barnet Gas and Water Company for a BRICK TANK, 81 ft. 6 in. diameter by 23 ft. deep.

Also a GASHOLDER, 80 ft. diameter by 23 ft. deep, with girders, columns, &c., complete.

Plans and specifications to be seen at the Gas Company's Office, EAST BARNET, after the 16th inst., where all particulars can be obtained.

Tenders to be delivered on or before Tuesday, the 24th inst., at the Company's Offices, 61, CHEAPSIDE, E.C.

The Directors do not bind themselves to accept the lowest or any tender.

East Barnet Gas and Water Company,
61, Cheapside, E.C., March 11, 1868.

TO GAS-FITTERS.

NOTICE is hereby given that the Gravesend Improvement Commissioners are ready to receive TENDERS for the supply and fixing of about 300 Four-feet REGULATOR BURNERS to the public lamps throughout the town. Each burner is to be fixed so that the tap of the same shall be below the lantern.

Any further information can be obtained on application to Mr. John Gould, Surveyor to the Commissioners, Parrock Street, Gravesend.

Tenders (sealed and marked "Tender for Gas-Burners") to be sent to my Office, 4, Edwin Street, Gravesend, on or before Monday, the 6th day of April next.

By order,
FRAS. SOUTHGATE,
Clerk to the Commissioners.

Gravesend, March 9, 1868.

POPE & PEARSON'S Gas Coal.—We beg to call the attention of all Gas Companies to this important winning, at a depth of 1275 feet. The yield of gas is more than 10,000 cubic feet per ton, with an illuminating power of 20 spermaceti candles, producing 12½ cwt. of coke per ton. The Coals are now being used by the Gas Companies in London. One Engineer, after trial, gives the following results:—

10,000	cubic feet per ton, and	19·13	candles.
11,468	,, ,,	16·57	,,
12,000	,, ,,	15·42	,,
13,260	,, ,,	15·00	,,

This valuable Coal can be delivered in London within 1s. per ton of the ordinary Newcastle Gas Coal; can be shipped at the ports of Hull and Goole, or by railway to any station.

For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near Leeds, YORKSHIRE.

GAS AND WATER PIPES.

CLARIDGE, NORTH, & CO.,

BILSTON.

AMMONIACAL LIQUOR.

THE Directors of the Imperial Gas Company are ready to receive TENDERS for all the GAS LIQUOR the Company may have to dispose of at their several Works at St. Pancras, Shoreditch, and Fulham, for Three or Five years, from the 18th of April next.

Tenders to be sent to the SECRETARY, at the Office, No. 33, John Street, BEDFORD ROW, on or before Tuesday, the 21th inst.

The Directors will not be bound to accept the highest or any tender.

Forms of tender may be obtained on application at the Company's Office.

March 13, 1868.

TAR & AMMONIACAL LIQUOR FOR SALE.

THE Directors of the Whitworth Vale Gas Company are prepared to receive TENDERS for the purchase of all the TAR and AMMONIACAL LIQUOR to be produced at their Works for one year, between the 4th of April, 1868, and the 4th of April, 1869. Tenders, which must state the price per ton, to be delivered on before the 21st of March next.

For further information, apply to the MANAGER, Gas-Works, Whitworth, near ROCHDALE.

Whitworth, Feb. 20, 1868.

TO IRON MERCHANTS, FOUNDERS, &c.

THE Wandsworth and Putney Gas-light and Coke Company are prepared to receive TENDERS for the supply of Cast-Iron MAIN-PIPES of all sizes, from 3 in. to 18 in. diameter, from the 31st day of March, 1868, to the 31st day of March, 1869.

The tenders to state the description of Iron, the prices per yard and per ton for each size, together with the weights.

The Pipes to be delivered, free of expense, on the trench in any part of the Company's district within a radius of 2½ miles from their Works.

Tenders to be sent under seal to the Offices of the Company, No. 14, High Street, Wandsworth, on or before the 28th instant, endorsed "Tender for Iron Pipes."

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,
ALFRED LASS, Secretary.

14, High Street, Wandsworth, March 7, 1868.

GAS TAR & LIQUOR FOR SALE.

THE Directors of the Wandsworth and Putney Gaslight and Coke Company are prepared to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR, either together or separately, which will be produced at their Works from the 31st day of March, 1868, to the 31st day of March, 1869.

Estimated quantity of Tar... 100,000 gallons.
Do. Do. Liquor 134,500 „

The person or persons whose tender may be accepted will be required to enter into a contract to remove the Tar or Liquor within four days after notice has been given that a freight is ready.

Tenders to be sent under seal to the Offices of the Company, No. 14, High Street, Wandsworth, on or before the 28th instant, endorsed "Tender for Tar and Liquor."

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,
ALFRED LASS, Secretary.

14, High Street, Wandsworth, March 7, 1868.

CANTERBURY GAS & WATER COMPANY.

CONTRACT FOR COALS.

THE Directors hereby invite Tenders for the supply at per ton, during the twelve months from this date, of 5000 tons of Lanchester Pelaw, Pelaw Main, or other good GAS COALS, and 500 tons of good CANNEL COALS, to be delivered in about the following proportions, dry, and free of expense, at either of the Canterbury Railway Stations, or at the Company's Works; the price at each place to be specified:—

Date.		*Gas.*	*Cannel.*
May	1 ..	300 tons.	
June	1 ..	300 „	
July	1 ..	300 „	.. 250 tons.
August	1 ..	300 „	
September	1 ..	300 „	
October	1 ..	450 „	
November	1 ..	600 „	.. 250 „
December	1 ..	700 „	
January	1 ..	700 „	
February	1 ..	550 „	
March	1 ..	500 „	

The weights to be ascertained at the Canterbury Railway Station.

Tenders, stating the sort proposed to be supplied, endorsed "Tender for Coals," to be sent on or before Thursday, the 26th of March instant, to the Secretary, who will furnish any further information required.

The Directors reserve the right to reject any tender.

By order,
JAMES BURCH, Secretary.

Canterbury, March 2, 1868.

NEWTON ABBOT GAS COMPANY, SOUTH DEVON.

THE Directors of the above Company are ready to receive TENDERS for the surplus TAR and AMMONIACAL LIQUOR made at their Works for a term of one, two, or three years, as may be agreed upon, from March 26, 1868. Quantity from 10,000 to 15,000 gallons per annum.

The Works are eligibly situated for carriage, being very close to the railway station, and on the banks of the river Teign, which is navigable—nearest port, Teignmouth.

Tenders to be sent to the SECRETARY on or before April 6, 1868.

Further particulars on application to Mr. JOHN BEARNE, the Manager.

CONTRACT FOR GAS COALS.

THE GOSPORT GAS & COKE COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for the supply of 4000 tons of unscreened good GAS COALS, to be delivered afloat into barges in Portsmouth Harbour, at the anchorage off the Gosport shore, in such quantities as may be demanded in the months of June, July, August, September, October, November, December, January, February, and March next, in cargoes about 300 tons. Rate of delivery, 1½ keel per working day.

The Coals to be the best of their kind, fresh wrought, dry, and free from dirt, slag, or other admixture.

The Coals to be tendered for are to be Wearmouth, Ravensworth Pelaw, Pelaw Main, Waldridge, and other good Gas Coal.

The tenders to state the prices for each of the above Coals, and any other good Gas Coals offered to be supplied.

Terms of payment by two months bills, payable in London.

Tenders to be delivered to the Secretary and Treasurer on or before the last day of March instant, endorsed "Tender for Coals."

The Directors do not bind themselves to accept the lowest or any tender.

HENRY COMPIGNÉ, Secretary & Treasurer.

Newtown, near Gosport, March 7, 1868.

CATHELS'S Patent Four-way Disc GAS-VALVE, now in general use, is the best Valve for Purifiers, Scrubbers, Station-Meters, and other apparatus in Gas-Works, ONE VALVE SERVING AS THREE ORDINARY VALVES, with a simplification of the connecting-pipes. It is simple, strong, and durable; has no springs, ground faces, or rubbing surfaces; is easily worked, and indicates at a glance the passage of the gas.

CATHELS'S Patent District Dry Gas GOVERNOR is the only perfect self-acting contrivance for regulating the pressures in the higher levels of a district. It enables such pressures to be reduced to any extent desired, and yet be INCREASED AND DIMINISHED, AS WANTED, PROPORTIONATELY WITH THE INITIAL PRESSURE. It is simple, certain in its action, and of moderate cost.

For descriptive circulars, prices, and testimonials, of the Valve and Governor, apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

FRASER'S PATENT RIBBED RETORTS.

These Retorts are now used at more than 60 Gas-Works, and continue to give satisfaction.

The Iron Retort is recommended for great durability. The Clay Ovens and Retorts obtain a more speedy and perfect carbonization of the Coal.

To ensure the excellence of the Brick Ovens and Fire-Clay Retorts, the Patentee has made arrangements with the following makers for their supply:—

Messrs. J. CLIFF & SON, Wortley, near Leeds.
E. BAKER & Co., Stourbridge.
W. COCHRANE CARR, Newcastle-on-Tyne.
W. FRASER, Inverkeithing, N.B.

Full particulars, with illustrated circular, testimonials, and prices, will be forwarded on application to A. C. FRASER, Gas-Works, COLCHESTER.

TO GAS ENGINEERS & FITTERS.

EVERY description of Gas Lanterns and Reflector Lamps for Shop Windows kept in stock. W. DAVIS, 17, Wells Street, Oxford Street, LONDON, W.

NINETEEN YEARS PRACTICAL EXPERIENCE.

EDWIN BENTLEY,
RETORT SETTER,
29, LOWER HOPE STREET, HALIFAX,
YORKSHIRE.

Fire-Clay and Iron Retorts, Double and Single Grooved Brick Retorts, of every description.

Bentley's Improved D Brick Segment Retorts, 5 or 3 in one bed.

Testimonials and references on application.

PURIFICATION OF GAS.

FRODINGHAM IRONSTONE MINES,
NEAR
BRIGG, LINCOLNSHIRE.

Gas Companies can be supplied from these Mines with OXIDE of IRON, for the purification of Gas, on reasonable terms, and in any quantity that may be required.

This material is a natural Oxide, and is supplied to Gas Companies as taken from the Mines, without any admixture of deleterious matter. It acts freely, and will purify a much larger quantity of gas per ton, than the generality of the material now in use under this name.

It will be found highly beneficial in large establishments, where they are liable to be called upon occasionally to make a much greater quantity of gas than usual, as well as in small establishments where they are limited in space, as by its adoption a much larger quantity of gas can in much less time be purified with the same quantity of material.

Apply to Mr. JAMES SHERWOOD, at the Mines; or to Mr. LIVESEY, 6, Victoria Street, WESTMINSTER, London Agent.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

NO NECESSITY
FOR
CANNEL COAL

If POPE and PEARSON'S GAS COAL is used.

WEST RIDING AND SILKSTONE COLLIERIES, NEAR LEEDS.

LAMP-POSTS—Plain & Ornamental.
DWARF GAS-PILLARS—Do., do.
LAMP-BRACKETS—Do., do.
LAMPS, in Copper, Tin, and Iron—Do., do.
NUMBERS for STREET-LAMPS.
FOUNTAINS—Garden and Drinking.
VASES—for Gardens, Terraces, &c.

A Book of the newest DESIGNS for these will be forwarded free on receipt of 3s. 6d. in stamps, which will be allowed on first order.

TURNER AND ALLEN,
Founders & Contractors,
201, UPPER THAMES STREET, LONDON.

B. CARPENTER'S
IMPROVED
WOOD SIEVES FOR GAS PURIFIERS.

WORKS:
14, JOHN STREET, PENTONVILLE ROAD,
LONDON, N.

The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

Testimonials from Gas Engineers who have tested their qualities forwarded on application.

All orders punctually attended to, and estimates given if required.

F. SIMMONDS, Senr.,
221, KINGSLAND ROAD,
RETORT & BOILER SETTER

For the Chartered Gaslight Company, Brick Lane and Curtain Road Stations, and numerous Gaslight Companies, London and Provincial.

NO CONNEXION WITH ANY OTHER RETORT SETTER.

Estimates given with or without materials.

Now Ready, in One Volume, 4to, price £1 1s.,

THE FIFTH EDITION OF

CLEGG'S TREATISE ON COAL GAS,

Illustrated by Numerous Lithographs and Wood Engravings.

The rapidly increasing sale of each succeeding edition of this Standard Work on Gas Lighting since its first publication in 1841, and its large circulation on the Continent and in America, shows the greatly extended interest of the subject, and that this Treatise has been found a valuable exposition of the various processes and apparatus employed in the manufacture and distribution of coal gas.

This edition has been carefully revised, and most portions of the work have been enlarged and re-written to adapt it to the present state of knowledge. Ten new plates and fifty additional wood engravings have been introduced, and one-third of new matter has been added to the letterpress. Though this "Treatise on Coal Gas" has thus been considerably enlarged, the publishing price has been reduced one-third.

LONDON: TRÜBNER & CO., PATERNOSTER ROW.

And to be had by order at the Office of this JOURNAL.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

WOLVERHAMPTON RETORT WORKS.

ESTABLISHED 1840.

JOHN EUNSON AND SON,

GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,

AND FIRE GOODS IN GENERAL,

WOLVERHAMPTON.

Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

ROBERT DEMPSTER,

Gas Engineer and Contractor, Rose Mount Foundry, Elland, near Halifax.

R. D. recommends his Fire-Brick Retorts to Engineers and Managers of Gas Companies; they last from 10 to 12 years.

Iron and Fire-Clay Retorts.
Annular and Pipe Condensers.
Scrubbers and Purifiers, all sizes.
Steam-Engines and Exhausters.
Hydraulic Centre-Valves.
Station-Meters and Governors.
Photometers & Pressure-Gauges.
Lamp-posts and Brackets.
Cast-Iron Mains and Syphons.
Wrought-Iron Tubes, Water Tanks.
Wrought-Iron & Cast-Iron Roofs.
Gasholders, Single-Lift or Telescopic.
Gas Castings of every description.
Retort Setters and Fitters sent to all parts of the country.
Wood Sieves for Purifiers.

Plans and Specifications prepared.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

19, NORTHUMBERLAND STREET, STRAND, W.C.

MR. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

THE LIQUID METER COMPANY,

LIMITED.

A. A. CROLL, Chairman. GEORGE RAIT, Managing Director.

238, KINGSLAND ROAD, LONDON, N.E.

THE

BRITISH IRON TUBE COMPANY,

MANUFACTURERS OF

PATENT WELDED WROUGHT-IRON TUBES & FITTINGS,

For Gas, Steam, and Water;

SCREWING TACKLE, CORE BARS,

Hydraulic and other Tubes and Coils, to order.

WORKS, WAREHOUSE, & OFFICES:

28, CHARLOTTE STREET, BIRMINGHAM.

AGENTS IN LONDON:

D. W. OGG AND CO., 3, JEFFREY'S SQUARE, ST. MARY AXE.

D. W. OGG and CO. have lately engaged to represent one of the largest shippers of Scotch Cannels at prices that cannot fail to command the attention of Gas Companies at a period like the present, when quality of gas seems so desirable.

Offices, 3, Jeffrey's Square, St. Mary Axe, LONDON.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

LAMBERTS

PATENT GALVANIZED IRON COCKS,

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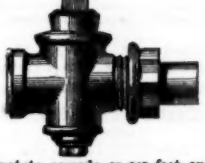

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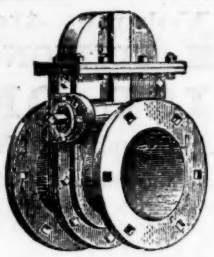

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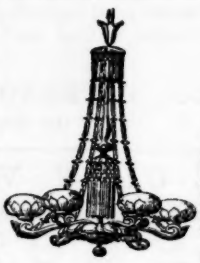

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10 ,,	10 10 0
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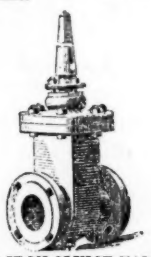

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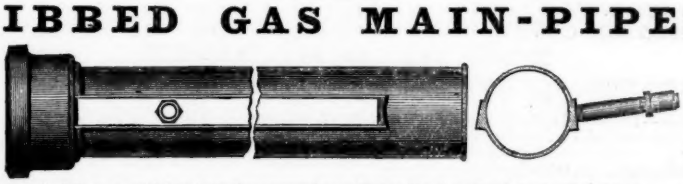

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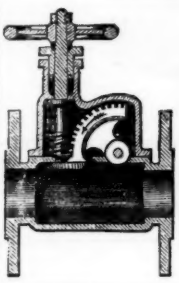

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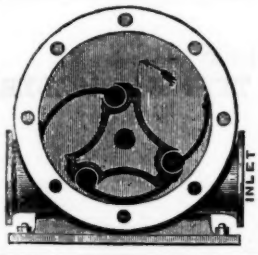

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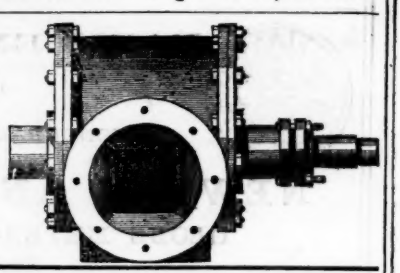

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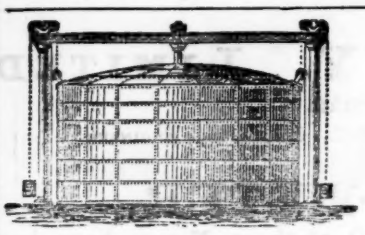

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